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MEDICAL HELMINTHOLOGY: A REVIEW.—(PART III).*

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NEMATODA.

Introductory.

Since the commencement of the *Bulletin* in 1912 the most important contributions to our knowledge of the parasitic nematodes of man have concerned their life-histories and bionomics rather than their morphology, *e.g.*, the elucidation by STEWART of the cycle of migration of the larval *Ascaris lumbricoides* through the liver and lungs after hatching of the egg in the stomach of the definitive host; the implication of certain species of Chrysops in the transmission of *Loa loa*; and the demonstration that the guineaworm is limited in its spread in tropical countries not merely by temperature and water conditions but by the capacity of certain species only of Cyclops to act as efficient intermediaries. Of great practical value as well as theoretically interesting are the researches which have followed BAERMANN'S pioneer work on the migration of the free-living larvae of hookworm in the soil. There have been many changes on the nomenclatural side, but these do not call for special comment, for such changes naturally follow upon a better understanding of the morphology of the parasites and their relationships. Those interested in the attempts to secure stability should compare the correct names as determined by Clayton LANE in 1916 and those now in use.

On the morphological side the number of papers dealing with the structure of the adult nematodes is surprisingly small. The detailed study of the morphology of the single species *Ancylostoma duodenale* by Looss (1905) remains a model which no one has attempted to emulate.

A certain number of new nematodes have been added to the list of those infecting man, viz., an eyeworm—*Thelazia callipaeda*, and two larval skinworms *Agamofilaria georgiana* Stiles, and *Agamofilaria streptocerca* (Macfie). In South America, a microfilaria has received a special name, *M. tucumani*, while in the Pacific Islands the

* For Part I (TREMATODA) *see* Vol. 19, pp. 361–365, and Vol. 20, pp. 857–864 For Part II (CESTODA) *see* Vol. 20, pp. 85–91.

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microfilaria without nocturnal periodicity has been called *M. philippinensis*. In North America WARD has recently reported a *Gongylonema* from man, while in Europe SAMBON (1924) has determined from an examination of the original illustration of the old *Filaria labialis* Pane (1864) that this worm belongs to the same genus. A female, apparently of a new species, has been named *Loa extraocularis* by SKRJABIN, though it does not appear to belong to this genus. The routine examination of the faeces of large numbers of persons during hookworm campaigns and in recruitments for war service has brought to light many interesting facts concerning the incidence of helminth infestation—incidentally it has revealed the accidental infection of man with the *Oxyuris tetraptera* of the mouse. "*Oxyuris incognita*" n.sp. identified on the egg found in faeces was for several years a puzzle to parasitologists, but has lately proved to be an egg of a common nematode infesting food plants!

Ascaris lumbricoides.

The starting point in modern advances concerning the life history of *Ascaris lumbricoides* is to be found in the preliminary note on STEWART'S investigations (1916) published in the *British Medical Journal*, 1st July, 1916, when he shewed, for the first time, that the embryos are liberated from ripe eggs when these are fed to rats and mice and migrate into the blood vessels of the liver, spleen and lungs during the succeeding four to six days. Between the sixth and twelfth day the young ascaris larvae passing into the airsacs cause haemorrhage and may actually cause the death of the host from the resulting pneumonia. If the animal recovers, the larvae are then found to have reached the intestine *viâ* the trachea and oesophagus. His later experiments (1916–1917) showed that after reaching the intestine the worms tend to be passed in the faeces, and the difficulty of inducing in young pigs an infestation with adult worms at first appeared to confirm STEWART in his early view that the rat or mice played an essential rôle as intermediate hosts. RANSOM and FOSTER (1917) repeated and confirmed STEWART'S facts, but, like all other authorities, believed that his hypothesis was fallacious and that under proper experimental conditions it would be found that development was direct and did not require an intermediate host. In their view age was an important factor in determining susceptibility of the host. The pneumonia following the pulmonary invasion with larval ascaris observed by STEWART in his experimental work is now recognized as a common symptom in young pigs and in young children. In Japan YOSHIDA (1918) had apparently been working on similar lines, for shortly after STEWART'S first communication this author published a series of observations on the results of feeding guineapigs with embryonated ascaris eggs. He came to the conclusion that the human ascaris eggs did not require an intermediate host but that the migration through the lung resulted in developmental changes which were an essential preliminary to the development of adult forms in the intestine. Having swallowed larvae from the lung of a guineapig without result this worker later swallowed larvae of larger size taken from the trachea of a guineapig and obtained evidence of success 75 days later from the presence of eggs in faeces. Meanwhile STEWART had continued to experiment with three-day old sucking-pigs and was led in 1920 to abandon his intermediate host theory. In 1921 FÜLLEBORN published the results of characteristically careful studies in which he traced the

passage of the larvae *viâ* the hepatic portals and hepatic veins to the lung. He shewed that the larvae could traverse the capillaries and were to be found in the kidneys, brain and placenta, and might even give rise to intrauterine infection. YOSHIDA, on the other hand, formulated the view that the larvae reached the lung from the abdominal cavity by piercing the diaphragm. This was not upheld by the more recent work of RANSOM and CRAM (1921) or NETTESHEIM (1922). The pathological changes in experimental animals were studied by MATSUBARA (1923), YOKOGAWA (1923). A large number of interesting clinical and pathological reports on the rôle of ascaris in producing various surgical involvements have been reported. These have recently been summarized, unfortunately without bibliographical references, by LE ROY DES BARRES (1924).

Many efforts have been made to induce hatching of embryonated ascaris eggs in artificial media, etc., but they have been almost uniformly negative. KONDO (1920) reports, however, the natural hatching of embryos in culture with animal charcoal. The embryos hatched after seventy days from the commencement of the culture and when smeared on the skin of young guineapigs successfully attacked the host and were afterwards found in the lung and liver. Other workers, YOSHIDA, etc., have successfully induced pulmonary invasion by subcutaneously inoculating embryonated eggs. In 1922 RANSOM gave a valuable review of the recent addition to our knowledge of the subject and discussed in detail the important public health problem of the relation of the ascariasis of the pig to that of man. KOINO reported two parallel experiments of infection of man with embryonated eggs from ascaris in man and pig. In both there was pulmonary migration but in the experimental infection with eggs from the pig the symptoms were slight and no adults resulted, whereas in the experiment with eggs from a human case the symptoms were very serious and fifty days after the test 667 immature worms were expelled by anthelmintics. The conclusion accepted at the moment by most workers is that the *Ascaris lumbricoides* of man and that of the pig are distinct biological strains. We shall see later that a similar conclusion has been formed regarding *Necator americanus*, just as recent work on *Hymenolepis nana* tends to lead in the same direction. OHBA (1923) and other Japanese workers have devoted much attention to the conditions under which ascaris eggs survive outside the body. Apparently the eggs cannot withstand actual desiccation but the albuminous envelope and thick shell resist in a remarkable fashion penetration by most fluids, including formalin, alcohol, lysol, etc.

Lagochilascaris minor.

The normal host of this intestinal worm is undetermined. It was first described from subcutaneous abscesses in a native of Trinidad (LEIPER 1910). A second and remarkable case has been noted in Dutch Guiana. The specimens were recovered from a mastoid abscess during operation, and were afterwards identified by LEIPER at the London School of Tropical Medicine (ORTLEPP 1924).

Dracunculus medinensis.

Guineaworm disease is peculiarly patchy in its distribution in tropical countries. It prevails chiefly in those parts where the water supply is scanty and where during the dry season the native population

is forced to rely upon wells and small collections of water. Prevention of guineaworm depends upon the adequate protection from infection of these sources of supply, by provision of pumps and of parapets, and for the exclusion of surface water. Little so far has been done to put into practice the sterilization of already infected wells. In 1911 LEIPER pointed out that a slight rise of temperature, to say 35° C., resulted in the death of cyclops and suggested that if such means were used during the dry season infected wells might be sterilized at slight cost. Following upon this suggestion for the use of heat, the impracticable suggestion has been put forward that the temperature might be raised by the addition of quicklime. ALCOCK (1912) recommended the addition of one pound of KOH to every 180 gallons of water, as a solution of 0·07 per cent. of caustic potash proves fatal to cyclops in from 2–10 minutes.

ROUBAUD (1913) experimentally confirmed LEIPER's view that the guineaworm does not infect cyclops by actively penetrating their bodies, but as a result of ingestion. Later work by CHATTON (1918) has shewn that an important factor in the distribution of guineaworm is the susceptibility or otherwise of the local cyclops. Of four species collected in the Oasis of Gabes one, *C. macruris*, proved refractory to experimental infection, while the other three species were readily invaded by guineaworm larvae; yet in none did metamorphosis occur even after 40 days. These observations were confirmed by ROUBAUD (1920) with local species of cyclops in Paris. In India, TURKHUD (1914) set out the data available regarding the distribution of guineaworm in the Indian Peninsula and with Glen LISTON (1914) published an interesting study of the infestation of villagers and cyclops in an endemic focus. During an epidemic at Sarsola, 10 miles from Tahna, 10·78 per cent. of the inhabitants and 38·6 per cent. of the cyclops were found to be infected.

Various remedies have been advocated in the treatment of guineaworm. GUPTA (1917) reported on the value of iodine lotion in the treatment of abcesses; JEANSELME (1919), MONTPELLIER & ARDOIN considered as specific the injection of arsenobenzol; while Scott MACFIE (1920) and others have pronounced equally favourably upon the value of intravenous injections of tartar emetic. GREY (1920) reported good results from the injection of 0·15 gm. of novarsenobillon in 20 cc. distilled water. The most recent papers on this subject are somewhat contradictory. LE DENTU (1923) states that the drug, though not infallible, gave on the whole very encouraging results, whereas FAIRLEY (1924) after considerable experience in India has abandoned it as useless. A curious line of treatment is that advocated by RICHARDS (1922), whose patients were given a pound or more of raw Indian sugar daily while starving with only a sufficiency of water. In all cases the worm could easily be wound out unruptured on the third day. X-rays have proved with DELORT (1919) a useful means of identifying calcified guineaworms lying in the tissues. RAY (1920) has reported a case of guineaworm abscess in the inguinal canal which had been operated upon as an "inguinal hernia." For PEYROT (1923) a case of delusional insanity in a native soldier with guineaworm was the result of toxic psychosis.

Thelazia callipaeda.

Specimens of Filaria oculi were described from the conjunctival sac of Chinese by STUCKEY (1917) and TRIMBLE (1917). These have been

identified by LEIPER from the description and drawings as probably belonging to the species *Thelazia callipaeda*, a parasite common in the eyes of dogs in the Far East. FISCHER (1919) examined specimens from Chinese dogs and arrived at the same conclusion.

Loa loa.

It is well known that infestation with this parasite may last for many years. BEGLE (1921) has reported a case in which embryos were found in the blood twelve to fifteen years after infection in Southern Nigeria. BAUMANN (1921) records the persistence of Calabar swellings for nine years. LOW (1923) attributes the "Calabar swelling" to the death of the adult worm. Attempts to destroy the embryos in the blood with tartar emetic injections in dosage totalling 25 gr. have proved unsuccessful (LOW & O'DRISCOLL 1921). For the intra-vitam differentiation of the embryos for staining, SHARP (1923) recommends methylene blue.

In 1913 LEIPER announced his discovery of the intermediate host of *Loa loa*, having implicated experimentally two species of chrysops, viz., *Chrysops silacea* and *C. dimidiata*. These results were confirmed by CONNAL & CONNAL in 1921 (1921, 1923), who worked out the complete life-history and showed that the final stage of development reached the proboscis in twelve days.

Loa sp. dub.

A new species of the genus named *Loa extraocularis* has been described from man by SKRJABIN (1917), but it does not possess the characteristic cuticular bosses and probably does not belong to this genus.

Onchocerca volvulus.

The chief points of interest regarding Onchocerca in man are the suggestion that this parasite may give rise to elephantiasis (OUZILLEAU 1913 and 1923) and that it is the cause of filarial itch (MONTPELLIER & LACROIX 1920–1921). The same species, or one closely allied, has been described by ROBLES (1919), CALDERON (1920) and GUERRERO (1922) as the cause of coast erysipelas in Guatemala. FÜLLEBORN (1923) records the infection from Mexico. The Onchocerca embryos have been found by several workers [OUZILLEAU (1912), FÜLLEBORN & SIMON (1913), MONTPELLIER & LACROIX (1921)], but CORSON (1922) failed to find a clear course of relationship between these larvae and the conditions of craw-craw, elephantiasis and lichenification. At Accra MACFIE and CORSON (1922) found the Onchocerca larvae in 34 per cent. of 50 healthy men, taken at random, in whom no tumours could be palpated. *O. volvulus* has a remarkably high incidence in the Belgian Congo. DUBOIS (1917) records 68 per cent. of infection with palpable nodules in adult natives in the Amadi-Suronga region. The parasite occasionally is the cause of abscess formation according to RODENWALDT (1912), KÜLZ and BACH (1913), FÜLLEBORN (1913), and ROUBAUD and JAMOT (1920). The new Microfilaria named by RODENWALDT (1914) *Microfilaria nuda* is thought to be the embryo of *O. volvulus*.

Filaria bancrofti.

Two very important papers, dealing with the morphology and differential diagnosis of microfilariae, were published by FÜLLEBORN

in 1913–1914. In the latter year WISE and MINETT supplemented previous reports by WISE on the intimate association between *Filaria bancrofti* and deep seated abscesses and septic processes in the lymphatics of the thorax and abdomen. The importance of streptococcal infections in filarial disease was further elaborated by ROSE (1915 and 1919), and by ANDERSON and his colleagues (1922). ZIEMANN, working in New Guinea, dealt also with this etiological problem (1913). Many claims have been put forward in favour of the filaricidal action of certain drugs, but none has been fully substantiated by later workers. BRANCH (1913) favoured salvarsan. ROGERS (1919 and 1920), ROY & BOSE (1922) tartar emetic, etc. ANDERSON, however, in 1922 made careful and detailed investigation of these substances reputed to be filaricidal, and reported that in no case could the drug be held to be lethal, although partial success was obtained with antimony compounds. On the statistical relationship between filarial incidence and filarial disease STEPHENS and YORKE (1920), STEPHENS (1921), BLACKLOCK (1922), CRUICKSHANK, CUNNINGHAM and IYER (1923), have made important contributions. Territorial studies on the incidence and pathological association of *Filaria bancrofti* have been carried out by BREINL (1912) in Queensland and more recently by CILENTO and RICHARDS (1924) for the whole of Australia. FÜLLEBORN (1912) dealt with the German South Sea Islands, and showed that the embryos found in the blood of natives of Bismarck archipelago, German New Guinea, Amboina and Celebes, had a nocturnal periodicity, whereas in Samoa and Fiji, Ponape and Yap, periodicity is irregular. BAHR (1912) has given a valuable account of the incidence, pathology and bionomics of filariasis in the Fiji Islands implicating the common mosquito of those parts *Stegomyia pseudoscutellaris* in the spread of the infection, and O'CONNOR (1923) has made a similar contribution to our knowledge of conditions in the Samoan Tokelau and Ellice groups of islands in the Western Pacific. As the result of the latter work, the breeding-places of this mosquito were discovered and preventive measures suggested. O'CONNOR's research is noteworthy, moreover, on account of the remarkable series of statistical surveys made on the various islands visited. These are likely to prove of value in coming years in determining the factors operating for or against the spread of the disease. In Cochin, CRUICKSHANK and WRIGHT showed that 20·9 per cent. of 1,000 cases had filarial embryos in the blood, 12·9 per cent. showed signs of elephantiasis, and 32·9 per cent. of the general population definite signs of filariasis. BAHR (1914) drew attention to the capricious character of the distribution of filariasis in the villages of Ceylon. JOHNSON (1915) found 19·25 per cent. of the inhabitants of the city of Charleston, South Carolina, harbouring filaria embryos in their blood. In the Argentine ROSENBUSCH (1916) observed that the embryos possessed no sheath, and neither showed periodicity nor gave rise to clinical signs. Earlier, a sheathed filaria, from this region, had been named *Microfilaria tucumani* and was reported by BIGLIERI (1923) as occurring in 43 out of 200 people. It was said to differ from *Microfilaria bancrofti* in absence of periodicity. TODD and WHITE (1917) drew attention to the remarkable localization of small endemic centres of filariasis and elephantiasis in the desert near Cairo. Preston MAXWELL (1921) reviewed the position of filariasis in China and FLU (1917–21) for the Dutch East Indies. The underlying cause of filarial periodicity has been the subject of many investigations and

hypotheses. YAMADA and YAMAMOTO (1916) and WAYAKAWA (1918) considered that the condition could be ascribed to oxygen chemotaxis. YORKE and BLACKLOCK (1917) thought it dependent primarily upon periodic variations in the arterial supply of larvae to the cutaneous vessels. LYNCH (1919) favoured a mechanical explanation and noted that in the collapsed lung of a dog infected with *Filaria immitis* the embryos accumulated in the lung in enormous number. SUGANUMA (1921) considered that the most important cause of periodicity was the strong negative heliotropism of the embryos.

Filaria conjunctivae.

Normally a parasite of the horse, several cases of this species in man have been recorded from Southern Europe. To these records there must be added recent cases by (*a*) Graham FORBES (1918) from soldiers in Macedonia, (*b*) CHARLES and SEWELL (1920) from a native of the Sialkot district, near Jammu State, India, and (*c*) by GUPTA (1921) from a Mohammedan who attended a clinic at Ramporehaut.

Agamomermis restiformis.

In 1880 LEIDY described as *Filaria restiformis* a blood-red worm passed alive from the urethra of a labourer in West Virginia. SMITH and DENNEY (1913) report a further case from North Carolina and express the opinion that these forms belong to the second larval stage of a species of *Mermis*.

Gongylonema hominis.

This tissue nematode, characterized by a series of large bosses of cuticle around the anterior end of the worm, has been recorded from man by WARD (1916) and by STILES (1921). Whereas WARD was inclined to identify his specimen as the same as *G. pulchrum* from the pig, STILES is of opinion that, on purely empirical grounds, both these specimens should be referred to a doubtful new species named *Gongylonema hominis*.

Habronema muscae.

In house-flies there are minute nematodes, named more than sixty years ago by CARTER of Bombay *Filaria muscae*. In view of the public health importance of flies attention may here be drawn to the important work of RANSOM (1913), which proved that the "Filaria muscae" is the larval stage in its intermediate host of *Spiroptera megastoma*, a nematode commonly parasitic in the stomach of horses. The eggs of the parasite passed in the faeces of the horse are consumed by the fly larvae and, after metamorphosis, these larval worms pass into the adult fly. The parasite of course is not a parasite of man.

Gnathostoma spinigerum.

Further cases of this aberrant parasite in man have been recorded by LEIPER (1913) and ROBERT (1922) from Siam, by SAMY (1918) from a Chinese coolie in the Malay Peninsula and by TAMURA, FUJITA and IKEGAMI (1919) from China and Japan. ROBERT makes the interesting statement that the parasite gives rise to migratory elastic oedema with painful irradiations and tends to escape from other surfaces as well as from the skin. He records a case in which one worm was discharged from the tongue and another from the pharynx, and believes

that its migrations may also be responsible for haemoptysis, haematemesis and haematuria. The morphology of the type species has been fully described, and the systematic relationship of the genus discussed by BAYLIS and LANE (1920).

Physaloptera mordens.

This round worm, which is apt to be confused with small specimens of *Ascaris lumbricoides*, was first described from Uganda. Further records (LEIPER 1915) have extended its distribution to Nyasaland and Portuguese East Africa, where it appears to occur not infrequently.

Rhabditis spp.

FRANCAVIGLIA (1916–17) has recorded the occurrence of *Rhabditis pellio* in the alkaline urine of a patient with interstitial nephritis, but considered that the worm was only accidentally present. KOBAYASHI (1920) described and illustrated a minute adult to which he gave the name *Rhabditis hominis* and which he found in 17 of 668 pupils of primary schools in Japan. He is of opinion that several Japanese descriptions of *Strongyloides stercoralis* actually refer to infections with this new worm. WATANABE (1922) also recorded a case of Rhabditis infestation to which he gave the name *R. faecalis* n. sp. His paper is in Japanese and the English summary does not contain any specific description. In a previous paper TORII and WATANABE (1922) also refer to the occurrence of eggs of Rhabditis in faeces as a possible source of confusion with *Strongyloides intestinalis*.

Strongyloides intestinalis.

The metamorphosis of the embryo of Strongyloides directly into the infective stage and indirectly by the development of sexual adults has been studied by ROSSEAU (1921). He concludes that the direct method is normal and intrinsic and is not due in any way to the composition of the culture medium. An interesting case of haematuria accompanied by the passage of numerous filariaform larvae of *Strongyloides intestinalis* is recorded by FORNARA (1922). THIRA (1919) has made histological studies on the tissues infected with Strongyloides and OHIRA (1913) has dealt also with the question of its pathogenicity. BRAU (1913) considered that this parasite not only caused profound modification of the normal blood count, but accompanied progressive anaemia, gastro-intestinal dyspepsia, and chronic diarrhoea. BARLOW (1915) added neurasthenia to the special symptoms attributable to this parasite, while HEMSEN (1923) described one severe and one fatal case of anaemia in which this was the only recognizable cause of disease.

Syphacia obvelata.

This common parasite of mice and its characteristic banana-shaped eggs have been found in faeces from Zamboanga, Philippine Islands, by RILEY (1919).

Oxyuris incognita.

During the War the examination of a large number of recruits in America led to the recognition in the faeces of a new and apparently unknown egg, which, owing to its size and contour, being somewhat flattened on one side, was identified by KOFOID and WHITE as probably a new species of Oxyuris which they provisionally named *O. incognita.*

During the hookworm campaign in Australia, also, this egg frequently appeared. It has recently been identified by SANDGROUND (1923) as the egg of *Heterodera radicicola*, a common parasite of food plants. It occurs therefore merely as a foreign body in human faeces.

Oxyuris vermicularis.

Mrs. PHILPOT (1924) and Japanese workers have re-studied the development of *Oxyuris vermicularis* and have concluded that development within the bowel is direct from embryonated eggs which have been swallowed. There is no migration through the lungs corresponding to that recorded for *Ascaris lumbricoides*. In her studies of the eggs of Oxyuris Mrs. PHILPOT has drawn attention to a hitherto unnoticed "emergence area" in the egg shell. Several papers have been written on the pathogenicity of Oxyuris. INNIS and CAMPBELL (1914), WOOD (1918), CHASSOT (1920) and EASTWOOD (1923) deal with the clinical condition sometimes known as "Appendicopathia oxyurica." Various substances have been recommended to replace santonin in the treatment of oxyuriasis, viz., salvarsan by HAJOS (1922), fresh blueberries by NYBERG (1923), aluminium subacetate by SCHMIDT (1922), while numerous papers have been published during recent years on a German proprietary treatment.

Trichuris trichiura.

The early phases in the life-history of this parasite have been studied by FÜLLEBORN (1923). Development evidently takes place as in Oxyuris without invasion of the vascular system. RODRIGUEZ-ARJONA (1915) calls attention to a severe type of chronic enteritis attributable to the whipworm. DA SILVA (1916) records cases of hyperemesis due apparently to the same cause, while numerous authors have written on the relationship between the whipworm and appendicitis. Of these may be noted SUZUKI (1916), DA MATTA (1917), and SANDERSVILLE (1920).

STRONG (1918) considers that the whipworm can give rise to severe anaemia, dirt eating, etc., constant eosinophilia and lymphadenopathy and that the symptoms and signs in this infection are practically identical with those of hookworm. POPOWSKI (1921) has shown that blood tests on faeces were positive in a considerable percentage of cases of infestation with whip-worm.

Trichinella spiralis.

RANSOM (1916) and RANSOM, SCHWARTZ & RAFFENSBERGER (1920) have shown that after 14 days of exposure to a low temperature, *e.g.*, 10° F., trichinous meat is markedly affected. If refrigerated at not higher than 5° F. for not less than 20 days, there should be little danger of infection. The temperatures used in smoking and pale drying are too slight to injure the parasites seriously, but the combined action of salt and temperature destroyed their vitality. Drying played a decided part in bringing about the destruction of the trichinae.

Haemonchus contortus.

In 1908 MAGALHAES recorded the presence in man in Brazil of this common parasite of sheep. This remained the sole record of human

infestation until 1924, when its occurrence in three aborigines in Northern Australia was affirmed by SWEET (1924), but the identification in these later cases was based solely upon the eggs found in the faeces.

Trichostrongylus colubriformis.

As *Strongylus subtilis* this worm was originally described by Looss as a parasite of man in Egypt. It has since been recognized under the name *Trichostrongylus instabilis*, as a common parasite of sheep in Europe, and a case in man in Russia has just been recorded by PODJAPOLSKAJA (1924). As long ago as 1892 the same parasite was described from sheep in India, under the name of *Strongylus colubriformis* by GILES [LANE (1913].

Trichostrongylus orientalis.

In the paper in which he created the genus *Trichostrongylus* Looss gave Japan as an endemic focus of *T. subtilis*. In 1914 JIMBO, however, reported 27 cases out of 57 autopses, as infections with a new species *T. orientalis*. OI (1916) and more recent writers have shown that in Japan, Korea and Formosa, the eggs of this parasite are commonly associated with those of the hookworm in the faeces of agricultural workers. LEGER (1921) describing results of the microscopic examination of 5,000 stools, noted three unrecognized nematode eggs, one of which was probably that of *Trichostrongylus*.

Oesophagostomum brumpti.

Immature forms of this parasite of the large intestine were first collected by BRUMPT in 1902, from East Africa [RAILLIET & HENRY (1905)]. LEIPER (1911) found six specimens among hookworms collected by FOY in Northern Nigeria and later identified the species in 5 per cent. of the prisoners in Zungeru in Northern Nigeria, giving the opinion, however, that it was the same as that occurring in the local monkeys. IHLE (1922), however, has pointed out that the form named *O. apiostomum*, which was found by WILLACH in Asiatic monkeys, differs in a number of small points from the African form. On this account he is led to make a new sub-genus *Conowebera* for the two species *O. apiostomum* and *O. brumpti*. GOODEY (1924), who has recently revised the genus *Oesophagostomum*, sees no valid grounds for its division into subgenera. The life of *Oesophagostomum apiostomum* outside the body has been described by WALKER (1913) and that of other species and their later stages within the body by GOODEY (1924).

Triodontophorus deminutus.

This parasite of the large intestine resembles a hookworm in the naked eye appearance of adult and egg, although its microscopical characters are markedly different. According to LEIPER (1915) it is of more than incidental occurrence in man in Nyasaland.

Syngamus kingi.

The record of gapes in the human subject is based on a single pair of Syngamus worms coughed up in blood by a nun, resident in St. Lucia [LEIPER (1913)]. The specimens differed from *Syngamus trachealis*. The species more recently noted in goats in the West Indies by RANSOM (1921) is probably identical.

Necator americanus.

In 1923 the Hookworm Commission of the Baltimore School of Hygiene found in 89·9 per cent. of the pigs in Trinidad a Necator closely resembling *N. americanus*. Further studies by ACKERT and PAYNE (1923) led to its differentiation under the name *N. suillus*. GORDON (1923) has studied in detail material from pigs in the Amazon region and is forced to the conclusion that the points of differentiation originally set out by ACKERT and PAYNE (1922) are not constant. GOODEY has attempted to infect young pigs in England with larvae of *N. americanus*, but without success. The clearing up of this question is obviously one of very great public health significance. As GOODEY points out, there occur in pig faeces eggs remarkably like those of hookworm, but which actually belong to nematodes of other genera which parasitize the pig. LAGG and RHEUBEN (1921) reported hookworm from semi-domesticated pigs in Queensland, which were identified as *Ancylostoma duodenale*. Five of these have since been re-examined by Dr. DARLING, and according to ALBISTON (1922) three proved to be *N. americanus* and two *Ancylostoma duodenale*. MAPLESTONE (1921) showed that in the Townsville district of Queensland none out of 182 pigs was infected with hookworm. O'CONNOR (1923) reported that *N. americanus* prevailed in the Gilbert and Ellice Islands, while *A. duodenale* was scarce. His identification of hookworms (*A. duodenale*) in the local pigs has been shown to be erroneous, his specimens having been described since as belonging to the genus *Globocephalus* [CAMERON (1924)].

Ancylostoma braziliense.

Under the name of *Ancylostoma ceylanicum*, a common parasite of dogs and cats was first identified by LANE (1913) as an occasional parasite of man in India, and later by DARLING in Malaya and Brazil. LEIPER (1913) first pointed out the apparent identity of *Ancylostoma ceylanicum* with *Ancylostoma braziliense*. This view has now been accepted by most recent writers, LANE (1922), DARLING (1923). As a parasite of dogs it has since been recorded from Sierra Leone, Zanzibar, Panama, British Guiana and the Philippines.

(*To be concluded.*)

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BERIBERI.

i. STANTON (A. T.). **The Control of Beriberi in the Far East.**—*Far Eastern Assoc. Trop. Med. Trans. Fifth Biennial Congress Singapore, 1923.* pp. 172–182. [3 refs.]

ii. SAWYER (W. A.). **Advantages of Nation-Wide and International Organization for Disease Control, with Special Reference to Hookworm Disease and Beriberi.**—*Ibid.* pp. 183–192. [5 refs.]

iii. BERNARD (Noël). **Recherches sur le béribéri.**—*Ibid.* pp. 193–204.

iv. FUKUSHIMA (Hisashi). **Beriberi and its Control in the Japanese Navy.**—*Ibid.* pp. 205–208.

v. NISHIMURA (Y.). **The Influence of Barley Diet on Ship Beriberi.**—*Ibid.* pp. 209–210.

vi. BARROWCLIFF (M.). **The Vitamins.**—*Ibid.* pp. 211–217.

vii. MEGAW (J. W. D.). **The Beriberi Problem.**—*Ibid.* pp. 218–233. [7 refs.]

i. This has already been fully reviewed (see this *Bulletin*, Vol. 21, p. 95).

ii. The author deals with the difficulties which are likely to result from compelling the use of unpolished rice through legislative enactments, and notes the results where these have already been carried. In the Pacific islands beriberi is not very frequent but is much in evidence among the pearling fleet at Thursday Island. The quarantine officer estimates that in 1922 about one-fifth of the men developed the disease. The diet consisted essentially of white flour, polished rice, and tinned foods. The officer at Port Darwin reported only six severe cases in sixteen months, all Europeans from the interior who had been living exclusively on white flour and corned beef; about six months of this diet is sufficient to produce beriberi.

iii. The substance of this paper has already been reported in relation to *Bacillus asthenogenes* [this *Bulletin*, Vol. 19, p. 755; Vol. 21, p. 635].

iv. An historical account of the steps taken by the Japanese Naval authorities to prevent the outbreak of beriberi. The rations in force at the present time are given in a table. During the last few years, it is stated, there has been a considerable increase in the incidence of the disease. Under 1·0 per 1,000 in 1912, in 1919–21 it was over 4·0. This was partly due to relapses of the disease contracted before entry and partly to an increase of white rice in the ration. Since 1921 the rice has again been reduced with good effects.

v. In 1922 the Nippon Yusen Kaisha put into operation a regulation that the boiled rice (the staple article of food for the crew) should be mixed with 30 per cent. of barley. The resulting reduction of the incidence of beriberi was very satisfactory. Figures from all the Japanese line steamers show that the incidence before the issue was 3·3 per cent., and afterwards 1·8.

Etiologically, the author considers that ship beriberi differs from shore beriberi as seen in Japan.

vi. This is a short résumé of our knowledge of the various vitamins and contains nothing new.

vii. Has already been reviewed (see this *Bulletin*, Vol. 21, p. 631).

P. W. Bassett-Smith.

COBB (C. E.). **Beriberi and Rice Control in Malaya.**—*Indian Med. Gaz.* 1924. Aug. Vol. 59. No. 8. pp. 401–402. With 1 chart in text.

The author noted that at the end of 1921 beriberi was increasing at Kuala Pilah, F.M.S. A detailed study of the disease showed that its disappearance in 1919–20 coincided with a time of rice shortage, and when again rice was plentiful beriberi again became endemic. At the time the improvement was noted the rice ration was reduced by about half and flour substituted, with a larger supply of sweet potatoes and Indian corn; the rice at the period was of an inferior quality, lightly milled and therefore richer in vitamins than white rice. The author concludes that beriberi can be eliminated from Malaya without the prohibition of white rice if [a large if] the natives can be persuaded to take a larger amount of flour and fresh vegetables in their diet, and if the importation of very highly polished rice is restricted. This requires more propaganda.

P. W. B–S.

BIJLMER (H. J. T.). **De Vitamine-rantsoeneering.** [The Vitamin Rationing.] (From the Medical Reports of the Scientific Central New Guinea Expedition, 1920–1921.)—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 4. pp. 657–669.

There were no cases of beriberi during this expedition, which is in striking contrast with previous experience in the same district. Besides unpolished rice (as far as practicable, in view of its durability) as principal food, the accessory foodstuffs issued were as good and as varied as possible.

Katjang idjoe (*Phaseolus radiatus*) cannot be taken long enough in the quantities required to supply vitamin B. Soja beans and peanuts were much appreciated, and Bijlmer expresses his satisfaction with the milkpowder "Trufood."

W. J. Bais.

VAN DER WALLE (N.). **Over beri-beri en het antineuritische vitamine.** [On Beriberi and Antineuritic Vitamins.]—*Nederl. Tijdschr. v. Geneesk.* 1924. Sept. 20. Vol. 68. 2nd Half. No. 12. pp. 1487–1498. With 8 figs.

A historical summary of the work on the etiology of beriberi done in Netherlands India, beginning with EYKMAN's experiments on polyneuritis gallinarum and VORDERMAN's statistical researches on beriberi in various prisons of Java and Madoera, which showed the composition of the food (rice) to be the only factor markedly correlated with the incidence of beriberi, investigations which have led to the study of deficiency diseases in general. Stress is laid on the importance of the determination of the quantity of phosphorus pentoxide contained in the grains (taught first by FRASER and STANTON) as a practical means of testing the quality of rice, a test extensively used by SCHÜFFNER and KUENEN in the plantations of Eastern Sumatra. An obstacle to the application of this knowledge on a large scale exists in the fact that rice not despoiled of the layer of aleuronic cells cannot be stored for a long time without being spoilt by insects or mould, whereas rice treated in this way can. The practical

fight against beriberi has to take account of this fact, together with the aversion to untreated rice shown both by natives and Europeans (soldiers).

N. H. Swellengrebel.

Blacklock (D. B.). **Investigation into the Causes producing Beri-beri in Freetown Prison, December, 1922.**—*Sierra Leone Ann. Med. & San. Rep. for the Year 1922.* Appendix 5. pp. 61–66. [2 refs.]

In the Freetown jail between June and the end of 1922 there was an outbreak of beriberi, 59 cases with 3 deaths.

Professor Blacklock investigated the nature of the diet and the method of preparation and cooking of the foodstuffs. He considered that the diet scale was good and that in all probability the outbreak was due to two factors : (1) Overcooking of the food ; (2) Deterioration of the rice from age and storage. The following important facts were particularly noted :—

The rice was cooked in a steam boiler for about 2 hours at a pressure of 10 to 15 lbs., the excess of water having been drawn off and *thrown away* with the soluble vitamins ; the actual time employed varied, but it was always too long. The rice sample from which the food was prepared consisted of bad, mixed with a little good grain, the former having been much destroyed by weevils, which also no doubt greatly reduced the vitamin content. As these conditions were present all through the year, the irregular outbreaks of beriberi must be influenced by other secondary causes, such as long storage, damp weather, gastro-intestinal disorders, and in native quarters by overcrowding and bad sanitation. Thus a diet which in the raw state contains just sufficient vitamin is by these methods of cooking so reduced in vitamin value that it affords but a small margin of safety ; this margin is largely lost when the rice grains are partly destroyed by weevils ; then an epidemic starts and continues, but is stopped at such times as new rice comes into use, age and storage *per se* having little influence.

It is recommended that damaged foodstuffs should be discarded, that the present methods of cooking should be corrected and the water in which the rice is cooked should not be thrown away. Raw tomatoes, etc., should be added to the diet, and a portion of the meat ration should always be in the form of liver, brain, or sweetbread, substances rich in anti-beriberi vitamin.

P. W. B-S.

Blacklock (D. B.). **Lack of Exercise as a Determining Factor in the Epidemiology of Beri-Beri.**—*Brit. Med. Jl.* 1924. June 14. pp. 1046–47. With 1 chart in text. [3 refs.]

A statistical record of beriberi in Freetown Prison, Sierra Leone, for a period of ten years. It is shown that both incidence and mortality were highest in persons of sedentary occupation. In 1922 out of the 59 subjects of beriberi there were 34 tailors, that is, 57 per cent. ; the average daily strength of tailors was 15 per cent. of all prisoners, thus 15 per cent. of the inmates engaged as tailors yielded 57 per cent. of all the notified cases of beriberi. It would therefore seem that there was something which rendered them specially prone to the disease. This did *not* depend upon long detention in the jail,

and on investigation the lack of exercise of these men was the most noticeable factor. When in 1923, with modification of the diet, exercise was made compulsory, there was a great reduction of cases, so that the usual autumn rise was absent. Experiments on fowls showed that in a group of animals subsisting on a diet with insufficient anti-beriberi vitamin, want of exercise was a very important factor in precipitating death. The deduction is that certain sedentary occupations, such as tailoring, mat-weaving and basket-making in jails, do not provide sufficient exercise. This opens up interesting problems in metabolism.

P. W. B-S.

Boycott (A. E.). **Lack of Exercise as a Determining Factor in Beri-Beri.** [Correspondence.]—*Brit. Med. Jl.* 1924. June 21. p. 1112.

The writer discerns a possible parallel between (1) the observation of Braddon & Cooper that a reduced carbohydrate diet is preventive of polyneuritis in birds, since birds experimentally starved do not develop the disease, and (2) Blacklock's observations that exercise is to some extent preventive of beriberi, since active exercise is in one sense equivalent to a reduction in diet (the food being dissipated straightway in work).

P. W. B-S.

Suzuki (Tadashi) & Mori (Shinnosuke). **Meningeal Cases of Infant Beri-beri in Manchuria.**—*Jl. Oriental Med.* Dairen. 1924. Feb. Vol. 2. No. 1. pp. 30–54. With 8 figs. [12 refs.]

The authors' special object was to demonstrate the pathology of the meningeal forms of infantile beriberi as observed by them in their own clinic. There were 110 cases, of which 13·8 per cent. were of the meningeal type, 75 per cent. cardiac, 16·8 paralytic, and 2·9 dropsical. The meningeal type was rare in young infants but prevalent after the 5th month; in 9 cases of the 14, the mother was suffering from beriberi. Its prevalence was greatest in the summer, and the mortality relatively to the cardiac type was small. The incubation averaged eleven days, and the duration of the disease about thirty-five days. Among the symptoms palpitation, enlargement of the liver, and distention of the abdomen were present in a large number, with ptosis and dimness of vision. By the examination of the spinal fluid and the fundus oculi during life stasis in the vessels was proved. The authors, from their observations, conclude that the stasis in the meninges and brain is the cause of the type of symptoms, just as in the cardiac type the paralysis of the heart causes stasis in the liver. The paper is illustrated by photographs of patients and by microphotographs.

P. W. B-S.

Fricker (J. M.). **Une épidémie de béri-béri à forme humide en France.**—*Arch. Méd. et Pharm. Milit.* 1924. May. Vol. 80. No. 5. pp. 453–461. With 1 chart.

In the summer of 1923 a number of Madagascan soldiers were admitted to hospital with oedema, mostly of the lower extremities,

and the symptoms were attributed to the hydropic form of beriberi, ankylostomiasis being carefully excluded. Fifteen were closely observed, and all rapidly recovered when put upon an anti-beriberi diet, including raw eggs, green vegetables, salads, lemons and yeast. The chief interest lies in the appearance of the wet type of beriberi among natives who had been on French soil for over a year, and the question arises: Were these "latent" cases imported from Madagascar, or was the disease contracted in France? The author believes in their endogenous origin, as the men had not shown any symptoms for over a year after landing (not a very sound argument), and it is stated that besides the dietary insufficiency it is necessary to take into consideration the susceptibility of the race. Among the French troops on the same diet in the same place there were no cases during the period.

P. W. B-S.

FINDLAY (George Marshall). **A Preliminary Note on the Destruction of Vitamin B by Age.**—*Biochem. Jl.* 1923. Vol. 17. No. 6. pp. 887–890. With 5 figs. [3 refs.]

The question of the destruction of vitamin B by age is one which requires further and fuller investigation, more particularly with regard to the effects of heat and moisture. The author found that samples of Indian lentils and peas which had been kept in bags in a dry room in Scotland for 38 years still contained an appreciable quantity of vitamin B. In comparison with the observations of GHOSE, however, they appear to have lost a small amount. Seeds which have lost the power to germinate have not necessarily lost all their vitamin content.

P. W. B-S.

BERNARD (P. Noël) & GUILLERM (J.). **Fermentation du contenu stomacal dans le béribéri humain et dans la maladie expérimentale due à *B. asthenogenes* chez le porcelet.**—*Bull. Soc. Path. Exot.* 1924. May 14. Vol. 17. No 5. pp. 382–397. [3 refs.]

In continuation of previous work the author describes in detail experiments to prove that in the contents of the stomach of both beriberi patients and piglets infected experimentally with *B. asthenogenes* there occurs a fermentation which is accompanied by an alteration of the natural secretions. This fermentation is characterized by hyperacidity due to lactic acid and volatile organic acids, and a hypochlorhydia or "hypopepsia" which goes on to "apepsia." It is associated with an asthenic condition of the stomach wall and retention of the contents of the organ. The walls of the stomach, constantly bathed in the hyperacid fluid, show congestion, erosions, and haemorrhagic ulcerations, both in man and in experimental animals. The experiments tend to show that the *B. asthenogenes* multiplies and coats the alimentary mass in the acute stages. In human beriberi at the time of death the organism is much less abundant. It remains to be proved whether *B. asthenogenes* causes gastro-intestinal symptoms, or whether it is only a secondary complication in beriberi; but in piglets fed upon the human beriberi stomach contents the same symptoms were produced as when they were infected experimentally with a culture of *B. asthenogenes.*

P. W. B-S.

i. Bernard (P. Noël). **Diagnostic bactériologique de** *"Bacillus asthenogenes."*—*C.R. Soc. Biol.* 1924. Dec. 5. Vol. 91. No. 34. pp. 1197–1198. [6 refs.]

ii. ——. **La toxine de** *Bacillus asthenogenes.*—*Ibid.* pp. 1199–1200.

i. The author again describes the characters of *B. asthenogenes* and points out that it has two distinct phases of existence—one aerobic and saprophytic in which spore formation is observed, and the second anaerobic when it secretes a toxin and develops pathogenic powers.

ii. The toxin is obtained from anaerobic cultures. The filtered culture contains only one-third the amount of toxin found in the unfiltered. It is lethal to rabbits when given intravenously, intracerebrally, and intraperitoneally, 1 cc. of the filtrate killing in 2 or 3 hours. The toxin produces necrosis of the skin at the site of injection, marked lesions of the stomach, intestines and kidneys, and has a special predilection for the nerve elements. An antitoxin can be prepared from horses which will neutralize its action.

P. W. B-S.

Kato (Genichi). **Further Studies on the Nervous Paralysis of the Polished Rice Disease.**—*Japan Med. World.* 1924. Sept. 15. Vol. 4. No. 9. pp. 233–237. [1 ref.]

This is a report of work carried out by several observers in Kato's laboratory at his suggestion, some results of which have already been published. Fowls were used. The H. ion concentration of the blood and tissue fluid around the nerves was estimated and the rate of the impulses in the nerves measured. It was found that in the affected fowls the H. ion concentration of the tissue fluid surrounding the sciatic nerve was markedly increased, while in simple starvation it remains normal. In the former the absorbability of positive charged ions is increased and the nerve is unable to conduct impulses normally. The normal rate of impulse is 60 to 70 metres per second, in the paralysed nerves 30 to 40 only.

It was found that the *direct* action of vitamin B will rapidly restore the conductivity of the paralysed nerve; it was also shown that the heated rice bran extract, free from vitamin B, can also cure the paralysed nerve when acting directly upon it, if the extract is nearly neutral or alkaline (pH 7·3). Ringer's solution containing a "buffer" substance (as bicarbonate of soda) (pH 8) can restore the rate of conduction of the diseased nerve if it is made to act directly on it, whereas the same solution without the buffer substance (pH 6·3) has no effect at all. The author concludes, therefore, that these experiments prove his theory that the paralysis is due to the variation of the H. ion concentration of the tissue fluid around the nerves.

P. W. B-S.

Hoagland (Ralph) & Lee (Alfred R.). **Antineuritic Vitamin in Poultry Flesh and Eggs.**—*Jl. Agric. Res.* Washington. 1924. May 3. Vol. 28. No. 5. pp. 461–472. [6 refs.]

A careful study was made by the authors of the value of the vitamin B content in the flesh of different varieties of fowls and eggs; pigeons were used as the test birds. Unlike Cooper, who states that egg

yolk exceeds all other foodstuffs in antineuritic value which is not materially altered by boiling for 4 minutes, they conclude that hens' eggs have a rather low vitamin value. Flesh from fowls was also relatively deficient, that of growing chickens had rather more B vitamin, the highest content being present in the livers. The details of the work are fully set out in protocols, but it is stated that the investigations were not sufficiently complete for final conclusions to be drawn.

P. W. B-S.

GARCIA (Faustino) & GUEVARA (Romulo). [In English and Spanish.] **A Study on the Toxicity of Tikitiki Extract by Parenteral Administration. La toxicidad del extracto de tikitiki por via parenteral.**—*Jl. Philippine Islands Med. Assoc.* 1924. Apr. Vol. 4. No. 4. In English pp. 125–132. [4 refs.] In Spanish pp. 157–159.

A very considerable number of experiments with the tikitiki extract were made on frogs, guineapigs, cats and dogs. The extract was from two sources, one from the Bureau of Science, in 50 mil bottles; the other in ampoules from Manuel Zamora; both were acid to litmus. Hypodermic injections of the semi-crystallized substance have given rise to toxic symptoms; hence this work. The results shortly stated were: (1) Subcutaneous, intramuscular, intraperitoneal and slow intravenous injections of the extract were fatal to the animals only in large doses; (2) It acts as an irritant to tissues causing congestion, oedema, and haemorrhages; (3) Rapid intravenous injections may kill immediately; (4) Its toxicity is lessened by neutralization with sodium carbonate; (5) Fatal doses when given either rapidly or slowly cause salivation, rapid and deep respiration, convulsions, with final cessation of the heart's action and respiration. For a man of 60 kilos weight 42 mils of the tikitiki extract is a sure sublethal dose.

P. W. B-S.

UYEHARA (Kikuji), So (Takehiko) & FUJINAMI (Hisashi). [**On the Influence of the Component of the Rice Bran Extracts against the Salt Metabolism in Beriberic Patients.**]—*Igaku Chuo Zassho.* (*Central Jl. Med.*). 1924. July. Vol. 24. No. 24. [Summarized in *Japan Med. World.* 1924. Oct. 15. Vol. 4. No. 10. pp. 262–263.]

In dry beriberi there was no increase in the NaCl in the blood, though an increase was found in oedematous cases. The secretion of NaCl by the kidneys in cases of oedematous beriberi is reduced on a diet deficient in vitamin B, but marked diuresis followed the administration of this vitamin. This was the result of restoring normal conditions and was not due to stimulation of the kidneys, for when this diuretic action was brought about by the vitamin B the salt content of the blood plasma was decreased.

P. W. B-S.

i. TAGAWA (Sentaro) & KANEKO (Shingo). [**Loss of Patellar Reflex in Beriberi and Sympathetic Muscular Tonus.**]—*Tokyo Igakkwai Zasshi* (*Jl. Tokyo Med. Soc.*). 1923. Dec. Vol. 37. No. 12. [Summarized in *Japan Med. World.* 1924. Mar. 15. Vol. 4. No. 3. p. 75.]

ii. Son (Yuko). [**On Beriberi Weak Vision Complicated with Retinal Hemorrhages.**]—*Chuo Gankwa Iho* (*Central Jl. Ophthalm.*). 1924. Vol. 16. No. 1. [Summarized in *J. M. W.* Vol. 4. No. 4. p. 102.]

iii. Ijiri (Matagoro). [**On the Poisonous Constituents of Urine of the Beriberic Patient.**]—*Chugwai Iji-Shimpo* (*Central Med. Jl.*). 1924. June. Vol. 43. No. 11. [Summarized in *J. M. W.* Vol. 4. No. 9. p. 237.]

iv. Tsuji (Yoshikiyo). [**On the Lipoid Contents of the Blood in Beriberi.**]—*Iji-Shimbun.* (*Med. News*). 1924. June. No. 1141. [Summarized in *J. M. W.* Vol. 4. No. 9. p. 238.]

v. Kobayashi (Yoshiwo). [**Studies on Edema of Beriberi. III Communication. On Salt Metabolism in the Patient having Beriberic Edema.**]—*Tokyo Igakkwai Zasshi* (*Jl. of Tokyo Med. Soc.*). 1924. Feb. Vol. 37. No. 2. [Summarized in *J. M. W.* Vol. 4. No. 6. p. 131.]

vi. ——. [**Studies on the Edema of Beriberi. IV Communication. On the Influence of Sitting Posture to the Water Metabolism in Beriberic Edema.**]—*Ibid.* Mar. Vol. 38. No. 3. [Summarized in *J. M. W.* Vol. 4. No. 8. p. 210.]

vii. ——. [**The Erythrocytal Precipitation Velocity of Beriberic Cases and other Edematous Cases with Special Relation to Serum Albumin-globulin Ratio.**]—*Igaku Chuo Zasshi.* (*Central Jl. Med.*). 1924. May. Vol. 21. No. 21. [Summarized in *J. M. W.* Vol. 4. No. 8. p. 204.]

i. The injection of adrenalin did not restore the patella reflex in cases of tabes and beriberi, though in other conditions, such as infectious jaundice, the lost reflex could be re-established.

ii. Two cases of defective vision in young adult beriberi subjects are reported. Haemorrhages were seen around the papilla. Intoxication from some unknown poison occurring in beriberi was believed to be the cause.

iii. The author states that he was able to separate the poisonous constituents (nature not given) from the urine and faeces of beriberic cases. These were said to have certain paralysing effects upon pigeons, guineapigs, mice and frogs.

iv. There were no marked quantitative changes in the amount of lipoid in the blood except in severe cases, when an increase of the total fatty acid contents was met with, but there was a decrease of cholesterin and lecithin. There was no regularity in these readings.

v. The author found that if he gave to a case of oedematous beriberi in the morning 10 grams of common salt in 1,000 cc. of water, the average urine passed in the next four hours was 500 cc. The water accumulated in the body and the blood concentration was decreased. The salt also accumulated in the body tissues.

vi. It is stated that in the sitting posture there was less secretion of water by the urine than in the recumbent position; after four hours there was no accumulation of water in the body, but the consistency (density?) of the blood was increased.

vii. The author states that by the red cell precipitation test beriberi oedema might be diagnosed from that of complicated kidney diseases, but not from that of cardiac oedema or granular kidney.

P. W. B-S.

i. Toide (Gumpei). [**On Human Case of Vitamin B Deficiency.**]—*Nisshin Igaku* (*Progress in Medicine*). 1924. Apr. Vol. 13. No. 6. [Summarized in *Japan Med. World*. 1924. Aug. 15. Vol. 4. No. 8. p. 204.]

ii. Kamiza (Rikei). [**On Beriberi-like Disease of Mammalians and Birds which develops in the Condition of Potassium Deficiency and Therapeutic Value of Potassium Preparations against Beriberi. II Communication.**]—*Jikken Igaku Zasshi.* (*Jl. Experim. Med.*). 1923. Aug. Vol. 7. No. 8. [Summarized in *J. M. W.* Vol. 4. No. 3. p. 78.]

iii. Ogata (Tomosaburo), Kawakita (Shintaro), Suzuki (Tsui) & Kagoshima (Shigeru). [**On Polished Rice Disease of Birds. II Communication. On Polished Rice Disease by Comparatively Vitamin B Deficit Feeding.**]—*Nissin Igaku* (*Progress in Med.*). 1924. Feb. & Mar. Vol. 13. Nos. 4 & 5. [Summarized in *J. M. W.* Vol. 4. No. 7. pp. 180–181.]

iv. ——, ——, —— & ——. [**On the Vitamin B Accumulation of the Viscera with Special Reference to that of Vitamin B Deficiency, or Polished Rice Disease.**]—*Ibid.* Apr. No. 6. [Summarized in *J. M. W.* Vol. 4. No. 8. p. 204.]

v. Ikeda (Tokichiro). [**Studies on the Efficacious Portions of Rice Bran Extracts upon Polished Rice Disease of Birds. II Communication.**]—*Tokyo Igaku Zasshi* (*Jl. Oriental Med.*). 1924. Feb. Vol. 2. No. 1. [Summarized in *J. M. W.* Vol. 4. No. 8. pp. 204–205.]

vi. Shibata (Yasaburo). [**On Diuretic Action of Suzuki's Roh-Orizanine.**]—*Iji Shimbun* (*Med. News*). 1924. May. No. 1140. [Summarized in *J. M. W.* Vol. 4. No. 8. p. 203.]

vii. Kondo (Yoshikazu). [**Contributions to the Knowledge of Polished Rice Disease of Fowl.**]—*Taiwan Igakkwai Zasshi* (*Jl. Formosan Med. Soc.*). 1923. Nov. No. 231. [Summarized in *J. M. W.* Vol. 4. No. 3. pp. 74–75.]

i. The author tried vitamin deficiency feeding on 5 subjects, including himself. Three were fed on polished rice and quickly developed symptoms agreeing with those seen in birds. Two were on a diet "supplied by T. factory," proved to be totally free from vitamin B [no detail given]; in these the symptoms were delayed but were similar to those of true beriberi. These experiments represented conditions of acute and chronic vitamin B deficiency.

ii. In animals fed upon polished rice with the addition of a small quantity of potassium carbonate the onset of the disease was delayed; but with the addition of a considerable quantity of sodium carbonate to a polished rice diet the latent paralysis and other symptoms developed earlier than in the controls. In both cases the symptoms were ameliorated by vitamin B—rapidly in the former case (K deficit), very slowly in the latter case (Na excess).

iii. The observations show that in polished rice disease there are two marked pathological stages, namely, a hyperglycemia, and a polyneuritic stage. They conclude that the polished rice disease in birds is quite different from the disease known as human beriberi.

iv. The authors were unable to find any deficiency of vitamin B in the liver of 14 patients; this they consider supports their view that human beriberi and vitamin deficiency disease are different.

v. From the rice bran extract the author obtained cholin, guanin, adenin, xanthin and hypoxanthin; cholin was apparently the most important, as it favoured the proliferation of bacteria.

vi. It has been found that Suzuki's Roh-Orizanine (a crude rice bran extract) is beneficial in oedematous cases of beriberi. Animal experiments,

carried out to determine the point, showed that it had no diuretic action on healthy rabbits or upon normal rabbits injected with saline.

vii. If a fowl is fed "for three or four times" upon a polished rice diet, it is said to acquire a certain degree of fastness against vitamin B deficiency, at least the development of symptoms is delayed. In the initial deprivations the islands of Langerhans in the pancreas were found to be increased in number, but not in the later privations. Warmth seemed to increase the susceptibility, but sex did not appear to have any influence.

P. W. B-S.

i. Ikeda (Tokichiro). **Ueber die wirksamen Substanzen in der Reiskleie gegen die Erkrankung der durch polierten Reis genährten Taube.**—*Jl. Oriental Med.* Dairen. 1923. Aug. & 1924. Feb. Vol. 1. No. 3. Vol. 2. No. 1. pp. 116–121; 90–101. [9 refs.]

ii. Bernard (Noël). **Recherches sur le béribéri.**—*Rev. d' Hygiène.* 1924. May. Vol. 46. No. 5. pp. 429–441.

iii. Massias (Charles). **Recherches nouvelles sur le béribéri.**—*Gaz. Hebd. des Sciences Méd. Bordeaux.* 1924. Apr. 13. Vol. 45. No. 15. pp. 228–230. [5 refs.]

i. This paper is almost purely chemical and should be read in the original by all who are specially interested.

ii. Contains nothing new, but repeats the author's views with regard to the relationship of *B. asthenogenes* and beriberi.

iii. Contains nothing new, but the work of Noël Bernard with the *B. asthenogenes* as an etiological factor is given marked prominence, as opening up new views and possibilities.

P. W. B-S.

SCURVY.

MIYAKE (M.). **A Statistical Observation of Infant Scurvy.**—*Jl. Oriental Med.* Dairen. 1923. Nov. Vol. 1. No. 4. pp. 163–168.

The great increase of infant scurvy in Japan is probably due to the increase of artificial feeding. There were 25 cases in 13 years in the clinic of Prof. HIRAI, Kyoto. 17 of these showed some kind of "hereditary" disease (phthisis 9, asthma 4), 19 were from middle-class families and 5 from poor ones. In 23 the development was feeble, in 6 the infants had never been given mother's milk, in 22 the principal food had been cow's milk, in 3 condensed milk. The incubative period varied between 6 days and 5 months. The symptoms are given with their percentage frequency. Blood tests, made in 18 cases, showed diminution in haemoglobin and red cells, with in some a leucocytosis. No new facts were observed, except that "the polynuclear leucocytes became nearer the lymphocytes." X-rays showed the so-called "crushed layer" in all cases, sub-periosteal haemorrhages in 1/3, haemorrhages in the bone, most marked in the central parts of the tibia and ribs; the distal end of the forearm was least affected. With 120 grams of mother's milk and over 15 grams of orange juice daily, the symptoms were in every case cured within one week.

P. W. Bassett-Smith.

i. ZILVA (Sylvester Solomon). **The Antiscorbutic Fraction of Lemon Juice. II.**—*Biochem. Jl.* 1924. Vol. 18. Nos. 3 & 4. pp. 632–637. [2 refs.]

ii. CONNELL (Sidney James Buchanan) & ZILVA (Sylvester Solomon). **The Reducing Properties of Antiscorbutic Preparations.**—*Ibid.* pp. 638–640. [7 refs.]

iii. —— & ——. **The Differential Dialysis of the Antiscorbutic Factor. II.**—*Ibid.* pp. 641–646. [4 refs.] With 1 chart in text.

i. Previous work has shown that the sugar can be removed from decitrated lemon juice by means of fermentation without destroying its activity. In the search for a simpler and quicker method, the purest fraction was obtained from fermented juice, decitrated by a modified method, the fermented solution being submitted to alcohol and basic lead acetate precipitations. Monkeys were used for the tests. The most powerful preparations, whilst keeping approximately the entire activity of the original juice, contained only 0·03 to 0·07 per cent. of solid matter in solution. All the active fractions reduce ammoniacal silver nitrate and decolourize potassium permanganate. The purest preparation showed an extremely low phosphorus and nitrogen content.

ii. Details are given which show that the reducing substance, or substances, is inactivated at a different rate from the antiscorbutic factor, so that part at least of the reducing material is chemically independent of the physiological principle.

iii. Zilva & MIURA in 1921 were able to show that the antiscorbutic factor of lemon juice diffuses through collodion membranes which

prevent the passage of methylene blue, etc. This further work based upon the same technique shows that: (1) The diffusion of the antiscorbutic factor proceeds differently from that of sugar and the nitrogenous substances present in decitrated lemon juice; (2) The antiscorbutic factor in swede juice and in lemon juice diffuses through membranes of the same permeability; (3) Indications were obtained which suggest that the size of the active molecule cannot be far removed from that of the hexoses.

P. W. B-S.

DELF (Ellen Marion). **The Antiscorbutic Value of Fresh and Canned English Tomatoes.**—*Biochem. Jl.* 1924. Vol. 18. Nos. 3 & 4. pp. 674–678. [4 refs.]

The juice of fresh tomatoes according to HESS (1920) is a powerful antiscorbutic, and also contains fat-soluble and water-soluble B vitamins. HESS & UNGER found that canned tomatoes also have important antiscorbutic properties after a year's storage. The present experiments were made to determine whether English tomatoes were similarly effective. The results did not prove equal to those claimed in America; they are given in the following table:—

COMPARATIVE VALUE OF FRESH AND PRESERVED TOMATOES.

	Minimum protective dose for guineapigs.	Average.
Pulp of fresh raw English tomato ..	1·5–2·5 cc.	2 cc.
Bottled tomatoes (Chivers) after 4–6 months' storage	5–10 cc.	7·5 cc.
Tomatoes canned whole, 1–2 months old	7·5–10 cc.	8·5 cc.
Tomatoes canned whole, stored 3¾–4 years	10 cc.	

Summary. 1. The minimum daily ration of raw fresh juice of English tomatoes protecting guineapigs from scurvy was between 1·5–2·5 cc.; it is thus not quite as effective an antiscorbutic as fresh orange or lemon juice.

2. A sample of bottled tomatoes (Chivers) which had been stored for six months was found to have lost about two-thirds of its original value.

3. By canning a loss of nearly three-quarters of the original value was sustained. After storage for nearly four years a further but smaller loss had taken place.

4. Canned tomato purée had lost about seven-eighths of the original value. It is very important that the date of manufacture should be stamped on all canned goods.

[The reviewer, in his experiments at Greenwich, found canned tomato a very effective curative agent for guineapigs.]

P. W. B-S.

GERSTENBERGER (Henry J.), CHAMPION (William M.) & SMITH (Donalda N.). **The Effect of Pregnancy on the Course of Scurvy in Guinea-Pigs.**—*Amer. Jl. Dis. Children.* 1924. Aug. Vol. 28. No. 2. pp. 173–182. With 2 charts. [4 refs.]

This is an exhaustive investigation extending over several years, carried out to determine the effect of pregnancy in guineapigs on the

antiscorbutic factor and general metabolism. The antiscorbutic used was 5 cc. of fresh orange juice; the average weight of the guineapigs was 500 grams. Many tables and charts are given illustrating the results of the experiments. From these it was evident that pregnancy postponed the development of the characteristic symptoms and lessened their severity; 5 cc. of orange juice supplied as much antiscorbutic factor as the animals would obtain from ordinary green food. There was no evidence that the guineapigs stored up antiscorbutic substances in greater quantity than non-pregnant ones.

It was constantly found that though the signs of scurvy were few during pregnancy (or none, according to NOBEL), the animals died very quickly after parturition, practically in the same way as the non-pregnant animals. This was shown not to be due to a deficiency of vitamin B. It is suggested that the symptoms of active and advanced scurvy are due to secondary bacterial infections, and that a scurvy diet does not produce typical scurvy in the pregnant guineapig because pregnancy possibly raises the resistance of the mother to bacterial invasion. There was no evidence that the foetus itself is able to produce the antiscorbutic vitamin, as does a sprouting germ.

[This emphasizes the fact generally accepted that vitamin C can only be elaborated by the vegetable kingdom.]

P. W. B-S.

MOURIQUAND (G.), ROCHAIX (A.) & MICHEL (Paul). **Action réciproque du terrain scorbutique et de l'infection expérimentale par une tuberculose virulente.**—*C.R. Soc. Biol.* 1924. June 27. Vol. 91. No. 22. pp. 205–208. [4 refs.]

In 1922, with M. BERTOYE, the following conclusions had been reached. In guineapigs a tubercular infection does not accelerate the onset or course of either acute or chronic scurvy. The scorbutic soil does not modify the anatomical evolution of tubercular lesions, but the duration of life is less than in healthy animals [see this *Bulletin*, Vol. 20, p. 399]. The authors' present experiments were made with a bovine strain of tubercle of reduced virulence. Each animal was inoculated with 0·5 mgm., or about 20 million bacteria. This massive infection did not modify in the least the course of the scorbutic lesions. On the other hand, the production of a soil deficient in vitamin C provokes changes in the evolution of tubercle. In animals suffering from chronic scurvy there was greater resistance to the onset, but a more rapid evolution. Reinfection of the animals suffering from chronic deficiency caused a very rapid development of the symptoms and death. In animals suffering from acute deficiency and inoculated, the scurvy symptoms were too rapid to permit sufficiently prolonged observations.

These facts are difficult to explain. They show that by experiment we are able to produce in the tissues certain conditions in which the same bacillus injected in the same dose and in the same way may produce different degrees of infection.

[Note experiment of reviewer in which marmite-fed guineapigs lived longer than controls when infected with tubercle.]

P. W. B-S.

Mouriquand (G.), Rochaix (A.) & Michel (Paul). **Intoxication tuberculinique et scorbut expérimental.**—*C.R. Soc. Biol.* 1924. June 27. Vol. 91. No. 22. pp. 208–209. [1 ref.]

The experiments were carried out to determine the effects of tuberculin on scorbutic animals. The guineapigs received 0·5 cc. of tuberculin three times a week for three months. The evolution of chronic scurvy was not accelerated by chronic tuberculin intoxication.

[Experiments with pigeons subjected to avitaminosis B, by MM. Arloing & Dufont, gave similar results. (Cong. Tub. Strasbourg) 1923.]

P. W. B-S.

Nassau (E.) & Scherzer (M.). **Skorbut und Infekt beim Meerschweinchen.** [Scurvy and Infection in Guineapigs.]—*Klin. Woch.* 1924. Feb. 19. Vol. 3. No. 8. pp. 314–316. With 2 charts. [12 refs.]

The question whether scurvy is an infectious disease has for long been under consideration; some authors even to-day, chiefly from clinical observations, class scurvy in adults among the contagious diseases. In infants the evidence of infection is less clear, deficiency in diet evidently playing the greater part. In childhood the following two facts are generally noticeable: the onset of the symptoms is almost always accompanied by fever, and there is early evidence of infections, to be regarded as evidence of reduced resistance. It is therefore probable that in infantile scurvy infection plays an important part by injuring the tissues and causing a more rapid destruction of the supplied vitamin and a quicker development of the scurvy symptoms with perhaps keratomalacia.

In the authors' experiments young guineapigs were infected with *Trypanosoma brucei* introduced intraperitoneally. 3–5 animals were used in each of 3 series, receiving: (1) Diet rich in vitamins; (2) Diet without vitamins; (3) No vitamins; not infected with trypanosomes. The infection must not directly affect the health of the animal and mask the scurvy symptoms. The animals on full diet and infected showed no evidence of illness (beyond presence of trypanosomes) in the trial period. In those on the scurvy diet, but not infected, the course was as usual, but in the infected animals on the same diet the signs appeared earlier (10 to 11 days) and the animals died on the 18th to 22nd day.

These experiments show that the combination of scurvy and an infection produces a marked acceleration in the course of the symptoms, but that the infection alone could not be responsible for this. They support the common clinical view that the occurrence and development of scurvy in infants is favoured by repeated and continuous infections.

P. W. B-S.

Iwabuchi (Tomoji). **Ueber Nebennierenveränderungen beim experimentellen Skorbut.** [Changes in the Suprarenals in Scurvy.]—*Beitr. z. path. Anat. u. z. allg. Path.* 1922. Aug. 26. Vol. 70. No. 3. pp. 440–458. With 2 plates & 4 charts. [36 refs.]

Typical changes were found in the adrenals of guineapigs fed upon a scurvy-producing diet. In the cortex there was a general reduction in lipoid formation, though in the inner reticulate zone the lipoid is

fairly abundant. The author describes three zones of cells: an outer, the "zona glomerulosa" with moderate, an intermediate or "zona fasciculata," very poor, and an inner, the "zona reticulata," rich in lipoids. Besides the loss of lipoids the cells of the intermediate zone often show degenerative changes, both in the nuclei and in the protoplasm with frequent mitosis. The capillaries are congested and haemorrhages are common. No evidence of thrombosis or necrosis was found. In the adrenals of starved guineapigs the high lipoid content described by most observers was found, but the amount was unaffected whether starvation were lingering or quick.

The conditions produced are illustrated by two plates.

[The conditions of the adrenals in scurvy guineapigs has been frequently described by McCarrison and others, who have all noted the haemorrhages, and great increase in size, etc.]

P. W. B-S.

Mouriquand (G.), Michel (Paul) & Berheim (M.). **Nouvelles recherches sur la sensibilisation de l'organisme du cobaye à l'avitaminose.**—*C.R. Acad. Sci.* 1924. Sept. 15. Vol. 179. No. 11. pp. 541–543. [2 refs.]

The authors have described how an attack of experimental scurvy in a guineapig sensitizes it to a later one. The present experiments were made to show if this condition continued indefinitely or gradually passed off. In their first series the period between cure and the fresh period of deficiency feeding was 12 to 42 days; in the present two series of guineapigs, 20 in each, the period was 62 or 87 days. The experiments demonstrated that the sensitization is only temporary, and that it becomes slowly less and less. The histological examination showed that it depends upon the long persistence of the minute lesions and disappears as soon as these do. This parallelism is a new proof that there is no true sensitization, but anatomical sequels, the evidence of which is only shown by minute histological examination.

P. W. B-S.

UNDULANT AND ABORTUS FEVERS.

San Román (Carlos Schneider). With Introduction by Pittaluga (Gustavo). **Contribución al estudio de la fiebre de Malta. Diagnóstico clínico y bacteriológico y tratamiento más apropiado de la misma, basado en la observación de 174 casos en la Ciudad de Yecla (Murcia).**—*Siglo Méd.* 1924. Aug. 2, 9 & 16. Year 71. Vol. 74. Nos. 3686, 3687 & 3688. pp. 113–117; 142–145; 165–167.

The first part of these papers is concerned with a general description of the symptoms and signs of undulant fever, which the author classes in three categories: (1) Cases of sudden onset with high fever, rigors and various visceral manifestations have been described, but among 200 patients the author has not seen a single instance; (2) Those with gradual rise of temperature, sweating, loss of appetite and increasing pallor, which are not numerous; (3) Those of an ambulatory type with irregular slight fever (which may be absent at the time of first coming under examination), general debility, malaise and vague pains. These constitute the majority and many are overlooked.

The second part deals largely with the question of diagnosis, clinical, and bacteriological by blood culture and agglutination. Agglutination in a serum diluted 1 : 20—1 : 50 is regarded as suspicious; above 1 : 50 as specifically positive. Mention, however, is made of the fact that *M. melitensis* may be agglutinated by the serum of tuberculous, enteric, typhus, and kala azar patients, but the titre in which this occurs is not stated. Treatment by vaccines is strongly recommended; the initial dose used was 250 millions and subsequent injections were given every 1-3 days, the interval and dosage being regulated by the clinical state. Serum therapy is not regarded with any favour. Compulsory vaccination of all the goats in the province of Murcia is recommended as a prophylactic measure.

H. Harold Scott.

Salvat y Navarro (Antonio). **Epidemiologia de la fiebre maltesa.**—*Rev. Española de Med. Cirug.* Barcelona. 1924. Nov. Vol. 7. No. 77. pp. 639-650.

This article consists of four sections preceded by an introduction. The first section deals with present ideas as to the close relations existing between *M. melitensis*, *M. paramelitensis* and *B. abortus*; the second with the epidemiological aspect consequent on this close relationship and the possible infection of man by *B. abortus*. The author does not agree that this is *never* pathogenic for man, but believes that some human subjects are susceptible and that the organism may, by passing through such, become "humanized" and more readily attack man. Section III mentions the regulations which have been promulgated to prevent the spread from animals to man, notably the inspection of herds, slaughter of infected animals, segregation of those giving positive serum reactions but from which the organism is not isolated, and so on. The fourth section deals in greater detail with preventive measures—the burning of contaminated pastures to obviate conveyance by soil and water, separation of infected animals to prevent further soil contamination, keeping the sexes apart, prohibition of the use of infected animals for food. For man the use of mixed vaccines of *M. melitensis* and *B. abortus* are recommended.

H. Harold Scott.

MITRA (Mariano). **La intradermoreazione nella febbre mediterranea dell' infanzia.**—*Pediatria.* 1924. June 15. Vol. 32. No. 12. pp. 721–724. [1 ref.]

Intradermal inoculation of *M. melitensis* vaccine in patients suffering or convalescing from undulant fever produces a definite reaction—a rise of temperature, intense erythema some 3 cm. in diameter, and painful oedema at the site of injection gradually disappearing in four or five days. The reaction runs parallel with that of agglutination, diminishing as the agglutination titre becomes less.

H. Harold Scott.

CREPIN (Joseph). **La chèvre est-elle responsable de la fièvre de Malte ?**—*Progrès Méd.* 1924. Sept. 13. No. 37. pp. 549–554. [10 refs.]

The author quotes the accepted belief that undulant fever is contracted through the consumption of goat's milk, and states that therefore without goat's milk there can be no such infection [a deduction which has never been made]. He then proceeds to demonstrate that all the evidence which has been brought forward is fallacious; that goats have nothing to do with undulant fever; that there is no such thing as a goat melitensis infection; that it is never found where the herds are under proper hygienic conditions; that if present it is only spread by human infection through the goat herds, etc. He states that the only proof which has been produced is bacteriological, and as the organism cannot be differentiated from *B. abortus* Bang this is most uncertain, and that all serum tests are absolutely unreliable. Portions of various scientific works on the subject are quoted, often apart from the necessary context, so as to support his argument. He particularly refers to and criticizes the Fontainebleau (Samois) outbreak, and that of the "Joshua Nicholson," and suggests that the transhipped animals were suffering not from a melitensis infection, but from strongylosis. Finally, he points out the importance of goat's milk as a financial and food asset to France in combating the infant mortality and general ill-health of the children, stating that the recommendation to boil goat's milk is both bad and physiologically wrong.

[One cannot too strongly deplore the publication of such a misleading and dangerous paper, for no matter how strong the prejudice of the writer may be, it is entirely against scientific and well-attested knowledge.]

P. W. Bassett-Smith.

DE KORTE (W. E.). **A Case of Probable Human Infection with the Bacillus of Epizootic Abortion.**—*S. African Med. Rec.* 1924. Oct. 25. Vol. 22. No. 20. p. 478.

The author describes the very interesting case of a man who apparently contracted a direct infection of *B. abortus* through the removal of the placenta from an animal suffering from "infectious abortion." The most important points noted were: Long duration of the incubative period, 8 weeks; absence of the usual headache and profuse sweats; agglutination of *B. abortus* Bang with the serum, not

M. melitensis; good curative result by the use of abortus vaccine. The rarity of infection with this organism among persons in the endemic areas of epidemic abortion is recognized; it was thought that the man handling the infected placenta and membranes had acquired a massive infection.

[If this was the case it is difficult to account for the long incubative period, and it is very unusual with the serum not to have an associated reaction with the *M. melitensis*.]

P. W. B-S.

i. Larson (W. P.) & Sedgewick (J. P.). **The Complement Fixation Reaction of the Blood of Children and Infants using the *Bacillus abortus* as Antigen.**—*Amer. Jl. Dis. Children.* 1913. Nov. Vol. 6. No. 5. pp. 326–333. [14 refs.]

ii. —— & ——. **Further Studies on the Epidemic Abortion Reactions in Children.**—*Ibid.* 1915. Sept. Vol. 10. No. 3. pp. 197–200. [5 refs.]

i. By the systematic use of an antigen made with *B. abortus* Bang it was noted that tests of the serums of women who had aborted gave a larger percentage of positive than did syphilitic antigen. Cotton & Schroeder found that 10 per cent. of market milk was infected with *B. abortus*; infection was therefore possible. 423 children were tested and 17 per cent. showed the presence of antibodies to this bacillus. The question arose, was this an active or passive infection?

ii. Blood taken from 42 newborn children or shortly after birth, when tested, gave in all negative results, but when the blood was taken from infants who had received other than breast milk a positive reaction was sometimes obtained and the infants showed enlargement of the spleen. Children giving a positive Wassermann may show a negative reaction to *B. abortus*. From this it is evident that a specific abortus infection occurs in infants but is generally, if not always, acquired from other than the maternal milk.

P. W. B-S.

Burnet (Et.), Brun (G.) & Bonan (A.). [**Sur une ostéite suppurée à "*Micrococcus melitensis*" chez un sujet convalescent de fièvre méditerranéenne.**]—*Revue tunisienne Sc. Médic.* 1924. Apr. Vol. 18. No. 4. [Summarized in *Bull. Inst. Pasteur.* 1924. July 15. Vol. 22. No. 13. p. 521.]

In a case of undulant fever which had relapsed three times at intervals of seven to twenty years, a suppurative osteitis was found in which the *M. melitensis* was demonstrated. It is noted that after the second relapse the patient had three miscarriages.

The suppuration had the character of a cold abscess. The authors consider that in countries where undulant fever is endemic it is necessary to examine bacteriologically all slow suppurative conditions of bone, and even cases of periostitis and chronic myelitis, for the presence of the specific organism.

P. W. B-S.

LEMAIRE (G.). **Méningite à mélitocoques. Altérations importantes du liquide céphalo-rachidien. Hyperglycorachie. Guérison.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1924. Nov. 27. Year 40. 3rd Ser. Vol. 48. No. 34. pp. 1636–1644. With 2 charts.

It is well known that *M. melitensis* produces a great number of local lesions and meningeal symptoms have frequently been described, but changes in the cerebrospinal structures have rarely been demonstrated. The author quotes fully a case in which apparently the early infection was latent and the first marked symptoms were those of meningitis. It was at first thought to be influenza, then tubercular, until the development of agglutinins and the isolation of *M. melitensis* from the cerebrospinal fluid proved its true nature. There was a decided increase in sugar content in this fluid. The author discusses the appearance and diagnostic value of the sugar increase in the fluid in bacterial and in non-infective cases. In the meningitis of undulant fever the cellular reaction is lymphocytic, similar to that found in syphilis and tubercle, but it is noted that on the sixth lumbar puncture in this case, when the nerve symptoms were passing off, there was a very great increase of albuminous substance, possibly due to the frequent injections of vaccine (septicémine).

P. W. B-S.

DE PARTEARROYO (F. R.). **Tratamiento de la fiebre de Malta.**—*Siglo Med.* 1924. Jan. 19 & Jan. 26. Year 71. Vol. 73. Nos. 3658 & 3659. pp. 53–57; 85–87.

The author reviews in detail the treatment of undulant fever—serum-therapy, vaccine-therapy, chemotherapy and symptomatic treatment. The serum may be administered subcutaneously, 30-40 cc. (in one case 70 cc. were injected) on the first day, and 20-30 cc. daily or on alternate days subsequently; or intramuscularly in severe cases, the dose being 20-30 cc.; in very severe cases by the intravenous route.

Vaccine-therapy is particularly useful for ambulatory, mild and chronic forms of the disease; autogenous vaccines are found best and the initial dose should be small, in case of intolerance. The author, therefore, begins with 25 millions and, if well tolerated, the dose can be gradually increased up to 2,000 millions, the injections being made every three days. The accidents and untoward symptoms incident to serum or vaccine therapy and their avoidance are mentioned. The causes of failure of vaccines are given as: (1) Use in the acute stages; (2) Erroneous diagnosis; (3) Too brief a period of treatment; (4) Too large doses.

Of drugs, neosalvarsan is particularly favoured in doses of 15 cgm., repeated, if necessary, on the following day. If well tolerated, but if the fever continues, the dose is increased to 30 and even 45 cgm., the higher doses being given every third day until the temperature falls. In one patient who showed no improvement at all after receiving 70 cc. of serum the fever subsided after the first injection of 15 cgm. of neosalvarsan.

[There are no original observations in this paper, and works reviewed are restricted; a rather too favourable view is taken of neosalvarsan treatment.—P. W. B-S.]

H. Harold Scott.

ARLOING (Fernand) & LANGERON (L.). **Un cas de mélitococcie. Vaccination curative avec phénomène d'Arthus.**—*Bull. Acad. Méd.* 1924. June 10. Year 88. 3rd Ser. Vol. 91. No. 24. pp. 736–738.

The patient was a pupil of the Veterinary College, Lyons, but the origin of the disease was uncertain. The fever was of an undulatory character with typical sweats, pains and large spleen. Haemoculture was not successful, but serum agglutination with *M. melitensis* was positive to 1-400. Treatment with a stock vaccine, which had been used for other cases, in 250 mil dose produced local necrosis and sterile pus at the site of the inoculation ; a second inoculation of the same dose and vaccine was followed by similar results, though less severe. No further inoculations were given but the patient made a good recovery, and in six months was in perfect health. The condition was looked upon as an anaphylactic phenomenon.

[The reviewer has reported a somewhat similar contretemps in which a melitensis vaccine, apparently harmless to others, produced at each inoculation local necrosis and suppuration, together with extensive purpura.]

P. W. B-S.

BURNET (Et.) & DE LAGOANÈRE (J. L.). **Pouvoir pathogène du *M. melitensis* et du *B. abortus* pour le rat et la souris.**—*Arch. Inst. Pasteur de Tunis.* 1924. June. Vol. 13. No. 2. pp. 182–191. [9 refs.] Shorter version in *Bull. Soc. Path. Exot.* 1924. June 11. Vol. 17. No. 6. pp. 465–467. [1 ref.]

It was found that the two organisms act in a similar manner in both rats and mice. Eighty *Mus decumanus* captured at Tunis from stables containing 3,000 goats of which 5 per cent. at least were infected with *M. melitensis*, when examined after death by culture methods did not yield a single colony of *M. melitensis*. This does not agree with the observations made on brown rats by English observers or of CONOR (1910) in Tunis. *M. melitensis* and *B. abortus* have the same pathogenic action in white rats. By subcutaneous inoculation it takes a million times the dose to infect white rats that it does to infect guineapigs. By ingestion it is difficult or possible only with very large doses. The infection appears rapidly and disappears quickly. The microbes are eliminated and cure is spontaneous. This short duration of the infection explains why natural infection has not been recorded in these animals. With brown and white mice the same dose was used as for rats ; both react to the two organisms. Mice are rather more sensitive than rats and could be used in default of guineapigs ; by mouth infection they were more resistant than by the skin. When infected the course is chronic, the centres of infection are the same as in the guineapig (spleen, lymphatics and bone marrow) and cultivation is easy.

Since the mouse is more sensitive than the rat and the evolution of the infection in the species is longer, mice are more likely than rats to act as reservoirs of the virus ; the mice, moreover, are able to communicate the infection to other animals, and amongst them the cat. The author has been able to infect cats by the subcutaneous method, but not yet by ingestion. Among rats and mice the infection does not always cause the appearance of agglutinating power ; this same irregularity occurs with guineapigs, goats and man. To

demonstrate the presence of an infection to *M. melitensis* and *B. abortus* the agglutination reaction is not therefore a reliable method.

P. W. B-S.

Polettini (Bruno). **Sui rapporti fra "*Micrococcus melitensis*" e "*Bacillus abortus*" (Bang).**—*Ann. d' Igiene.* 1924. Oct. Vol. 34. No. 10. pp. 701–715. [15 refs.]

The author carried out tests with 8 strains of *B. abortus* and 6 of *M. melitensis* in order to determine points of distinction, if any, between the two organisms. Firstly, cultural tests were made on several media, but no differences could be detected. He next performed inoculation experiments, subcutaneously, intraperitoneally and intravenously, on a large number of guineapigs, but again found identical tissue-changes at autopsy. Lastly, serological tests were performed—agglutination and absorption of agglutinins and complement fixation. Here certain differences were noted. Anti-abortus and anti-melitensis sera agglutinated their respective organisms in much higher dilution than the heterologous ones if the sera used were those obtained from patients or from animals experimentally immunized by the author, but with the ordinary commercial immune sera no differences were detected. Also the complement-fixation power of anti-melitensis serum was four to eight times as great with *M. melitensis* as with *B. abortus.*

In view of these close relations it is suggested that the name *Brucella* be applied generically, the organism of undulant fever being designated *Brucella melitensis*, that of contagious abortion *Brucella melitensis abortus* [see Evans, this *Bulletin*, Vol. 21, p. 106].

H. Harold Scott.

Domingo (Pierre). **Etudes sur la fièvre de Malte. Réaction actuelle optima des milieux destinés à la culture du** *Micrococcus melitensis.*—*C.R. Soc. Biol.* 1924. Mar. 28. Vol. 90. No. 11. pp. 819–820.

A strain of *M. melitensis* which had been shown to agglutinate well with specific serum lost this property when grown on strongly acid media, and if cultured on very alkaline media it was agglutinated by non-specific sera. Nine strains were studied in media varying from pH 8·8 alkaline to 6·8 acid reactions. The optimum for cultures was found to be pH 7·6. It was found that a *M. melitensis* cultivated in a medium more alkaline than the optimum acidified it up to 7·6. If grown in acid or neutral media it varied the reaction of the media as follows: 6·6 to 7·2, 6·4 to 7·2, 6·8 to 7·2, 7·2 to 7·6, 7·2 to 7·6, and 7·4 to 7·6. The author thinks that this modification of the medium by the organism is an evident proof of marked biological adaptation.

[The reviewer has never been able to grow the *M. melitensis* upon very acid media; it has generally been found to be very sensitive to reaction.]

P. W. B-S.

Gerbasi (Michele). **Nuove ricerche sul micrococco paramelitense.**—*Pediatria.* 1924. Oct. 1. Vol. 32. No. 19. pp. 1139–1143. [4 refs.]

The serological tests applied to melitensis, paramelitensis and abortus organisms having shown their close affinity, although the biochemical

(K2251)

GERBASI (Michele).

Strain.		Agglutinability.			Clotting of Milk.	Production of Indol.	Fermentation of Sugars.				
		Anti-melitensis serum. Berne.	Anti-melitensis serum. Palermo.	Anti-paramelitensis serum.			Glucose.	Levulose.	Lactose.	Maltose.	Saccharose.
Para-melitensis	I	neg.	neg.	+1/5,000	neg.	—	+	+	+	+	+
	II	neg.	neg.	+1/5,000	incom.	—	+	+	+	+	+
	III	neg.	neg.	+1/2,000	incom.	—	+	+	+	+	+
Melitensis	I	+1/2,000	+1/1,000	neg.	neg.	—	+	+	+	+	+
	II	+1/1,000	+1/1,000	neg.	neg.	—	+	+	+	+	+
	III	+1/1,000	+1/1,000	neg.	neg.	—	+	+	+	+	+
	IV	+1/1,000	+1/1,000	neg.	neg.	—	+	+	+	+	+

Table showing the results of serological and cultural tests with the *melitensis* strains mentioned in the text.

reactions, especially as regards the clotting of milk and the fermentation of lactose, are said to differ, the author decided to repeat the tests, and did so in three series: (1) The study of the biological properties of *M. paramelitensis* (3 strains) before passage through animals; the anti-melitensis sera were obtained from Berne and Palermo; the sugars were 1 per cent. in alkaline broth. (2) Analogous tests with *M. melitensis* (10 strains); the Table subjoined gives the results of them. (3) Similar to those of (1), but after passage through young guineapigs; the only differences were that strain III was agglutinated by the homologous serum in 1 in 5,000 in place of the previous 1 in 2,000, and that strains II and III no longer retained the property of clotting milk.

The author draws comparisons between *M. melitensis* and *M. paramelitensis* on the one hand, and *B. typhosus* and *B. paratyphosus* on the other, and adds that his recent researches have demonstrated that *B. paratyphosus* freshly isolated and passed through a guineapig can assume the characters of *B. typhosus*.

H. Harold Scott.

Cazeneuve (H. J.). **L'hémoculture dans la fièvre méditerranéenne. Isolement du *Micrococcus melitensis* par ensemencement sur gélose glucosée inclinée du sang hémolysé dans de l'eau distillée.**—*Jl. Méd. de Bordeaux.* 1924. Aug. 25. Vol. 101. No. 16. pp. 702–703.

The author describes a method which, he finds, appreciably shortens the time required to isolate an organism from the blood. 5 cc. are drawn, mixed with 15 cc. of distilled sterile water, shaken well for 5 minutes, and then to each of 10 cc. glucose agar slopes 2 cc. of the blood fluid are added. These are kept for one hour in the incubator at 37° C. with the surface covered with the fluid and then placed upright for 24 hours; if then no colonies are visible the tubes are again sloped for an hour and replaced. Some of the tubes are thus treated twice, some three times. On the fourth day colonies of *M. melitensis* will be found in most of the tubes. Further identification can be carried out in the usual way. It is stated that by this means a positive culture was obtained in one case 21 days after the last pyrexial period. The method is recommended for the isolation of many organisms from the blood, especially those requiring the presence of haemoglobin, as meningococcus, streptococcus and *B. pestis*.

P. W. B-S.

Nattan-Larrier (L.). **The Diagnosis of Malta Fever.**—*Franco-Brit. Med. Rev.* 1924. Oct. Vol. 1. No. 1. pp. 1–8.

This paper has been summarized [see this *Bulletin*, Vol. 21, p. 648]. The methods used for diagnosis are detailed, blood culture, serum agglutination, and intradermic methods being of the greatest value, but the optimistic value placed on the latter procedure is open to question.

P. W. B-S.

Vernoni (Guido). **La febbre maltese.**—*Terapia.* Milan. 1924. Sept. Vol. 14. No. 63. pp. 278–282.

A general sketch of undulant fever, suitable for a class lecture. It is clearly expressed, but contributes nothing new to the subject.

H. Harold Scott.

ROCKY MOUNTAIN FEVER.

CONNOR (Charles L.). **Immunity in Rocky Mountain Spotted Fever.**—*Jl. Immunology.* 1924. July. Vol. 9. No. 4. pp. 269–289. [9 refs.]

This important report is so condensed that it is difficult to abstract further and should be read in the original. The following are the most significant points. It is almost impossible to attenuate the virus in the blood because the organisms in this fluid are so scanty. In tick tissues and tissues of infected guineapigs the virus may be attenuated by drying in the cold; after keeping for 5 to 30 days at a temperature below zero the tissue is no longer virulent, but will produce immunity. The combination of virus and immune serum is most effective when the virus is given in rather a large dose and allowed to develop for 24 hours, and then a dose of serum is given to stop infection. Another but more limited method is to give rather large doses of the mixture of the virus and serum. An immunity may be obtained equal to that which follows an attack. Heating the mixture of virus and serum at 60° C. for 20 minutes renders it ineffective. The virus-serum mixture is at present only applicable to guineapigs; for larger animals a much more concentrated virus is required. Immunity depends only on the amount of the virus given. The immune body appears to have nothing to do with the production of immunity in another animal.

P. W. Bassett-Smith.

CONNOR (Charles L.). **Quantitative Peculiarities of Mixtures of the Virus and Immune Serum of Rocky Mountain Spotted Fever.**—*Jl. Med. Res.* 1924. Mar. Vol. 44. No. 3. (Whole No. 192.) pp. 317–328. [2 refs.]

The peculiar irregularity of the "zone reaction" or quantitative relation between the protective serum and the virus of Rocky Mountain fever was first noticed by RICKETTS. A study of this reaction has been made by the author, who, working with the virus in guineapigs' blood or serum collected at the height of the disease (·003 being often the lethal dose) and the serum of immunized rabbits or guineapigs, confirmed the observations of RICKETTS.

The following conclusions were arrived at:—

"1. A paradoxical reaction occurred when titrating the protective property of an immune serum against the virus of Rocky Mountain spotted fever, a small amount of the serum protecting when a larger amount would not. This is part of a reaction showing a 'zone' phenomenon; for by increasing the amount of serum it again protects.

"2. The phenomenon has been reproduced with immune serum collected early in the disease only, or shortly after reinoculation of an immune animal with virus. It occurs also with normal rabbit serum. It occurred only when the mixtures of virus and serum were diluted with salt solution. A question as to its specificity is raised.

"3. The reaction is independent of the presence of complement, and the immune serum shows no agglutinating or precipitating action.

"4. Because of the irregular reaction of mixtures of virus and serum diluted with salt solution an important practical point is brought out. Such diluted mixtures will not give the correct protective titre of the serum."

P. W. B-S.

GREELEY (H. P.). **Mercurochrome-220 Soluble in Rocky Mountain Spotted Fever.**—*Jl. Amer. Med. Assoc.* 1924. Nov. 8. Vol. 83. No. 19. pp. 1506–1507. With 1 chart.

The author reports a case of Rocky Mountain fever from Southern Montana which he treated successfully with an intravenous injection of 20 cc. of a 1 per cent. solution of mercurochrome 220. This was followed by a marked reaction, chill and temperature of 104·8°, but after six hours the pains, etc., were relieved. It is stated that the disease was arrested clinically by the injection. The case is reported in the hope that further trials may be made with this drug where the disease is prevalent.

P. W. B-S.

JAPANESE RIVER FEVER.

WALCH (E.) & KEUKENSCHRIJVER (N. C.). **Eenige opmerkingen aangaande de Epidemiologie van de Pseudotyphus.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 2. pp. 247–276. With 8 figs. & 2 graphs. [12 refs.]. English summary pp. 274–275.

An epidemic of pseudotyphus was noted in young overgrown rubber estates in Sumatra. Fifty per cent. of captured rats harboured *Trombicula deliensis*, with an average of 104 per mite-carrying rat. They were also found upon men and two species of birds. Two new species of Trombidia also were observed on man and *T. oudemansi* once. A man on whom *T. deliensis* was found developed pseudotyphus shortly afterwards. *T. schuffneri*, the common forest mite, can carry the infection, but only when there are many human cases; it plays but a small part in spreading the disease. The disease can be transmitted to gibbons, but not to macaques. An emulsion of *T. deliensis* and the blood of a pseudotyphus patient are equally effective in inoculation of the gibbon. After inoculation rats show no sign of the disease, but the spleens were found to be 1·7 times the ordinary weight, and rats caught in the endemic area show a large percentage with enlarged spleens; it is therefore probable that rats, as in Japan, act as reservoirs.

P. W. Bassett-Smith.

NAGAYO (M.), MIYAGAWA (Y.), MITAMURA (T.), IMAMURA (A.), TAMIYA (T.) & SATO (K.). **On the Experimental Tsutsungamushi Disease in Monkeys by Intracutaneous Inoculation of the Virus.**—*Scientific Reports from Govt. Inst. for Infect. Diseases, Tokyo*, 1923. Vol. 2. pp. 371–373. [Authors' Abstract.]

The authors found that no local diagnostic reaction followed subcutaneous injection of the virus of Tsutsugamushi disease, such as is seen after natural infection through the bites of infective mites. They therefore carried out experiments with monkeys to determine if intracutaneous injection would not be more successful, a procedure which imitates more closely the natural method of infection. They found that a distinctive local papule was present after the 3rd-5th day, and histologically the lesion was similar to that seen after a mite bite; secondary lymphatic signs and fever followed. Animals which had

been immunized gave no specific local reaction. The amount of inoculum required to infect intradermally was about 1 10 that required subcutaneously, but the larger the dose the shorter the period before appearance of the reaction and incubation of the fever. From these experiments the authors conclude that the skin is a favourable site for the development of the virus and the method should be of great value for diagnosis.

P. W. B-S.

DENGUE, PAPPATACI AND UNCLASSED FEVERS.

FARRER (E. M.). **Clinical Observations on the Recent Epidemic of Dengue Fever in the Punjab.**—*Jl. Assoc. Med. Women in India.* 1924. May. Vol. 12. No. 2. pp. 20–22.

This was a very widespread epidemic affecting Europeans and natives indiscriminately. The saddle-back type of fever was not frequently noticed. Special reference is made to the glandular implication which generally subsided as the rash faded. The author is very dogmatic in distinguishing this disease from the seven-day fever: "How any one who has seen the two diseases can think that they are the same passes my comprehension." This is, however, a matter of opinion and experience.

P. W. Bassett-Smith.

GIORDANO (Mario). **Osservazioni sopra una piccola epidemia di "Dengue" a bordo della R. Nave "Ammiraglio Magnaghi."**—*Ann. di Med. Nav. e Colon.* 1924. May-June. Year 30. Vol. 1. No. 5–6. pp. 220–231. [16 refs.]

Of a complement of 210 in the Italian ship "Ammiraglio Magnaghi" 70 were attacked by dengue between 2nd and 12th April, the maximum number of fresh cases (22) occurring on the 7th. There was no secondary rise of temperature with the appearance of the rash on the 4-5th day, except in two instances, and in these the rise was small, a few points in one case and to 39° C. in the other. The author thinks that the vector is a Phlebotomus and that quinine (20 cgm. of the bisulphate) is the best prophylactic.

H. Harold Scott.

WHITTINGHAM (Harold E.). **The Etiology of Phlebotomus Fever.**—*Jl. State Med.* 1924. Oct. Vol. 32. No. 10. pp. 461–469. [13 refs.] and *Public Health.* 1924. Nov. Vol. 38. No. 2. pp. 56–60. [13 refs.]

An interesting incident is quoted from Sir W. BURNETT of the occurrence of sandfly fever in the Royal Navy during the blockade of Malta in 1799. The author states that phlebotomus fever is now one of the chief causes of inefficiency in the R.A.F. serving overseas (50 per cent. of total sickness). The pappataci is the true "carrier" and functions when the mean daily temperature is 65° to 90°, wherever there is sufficient moisture and organic debris for the fly to complete its life cycle; this is the case at Malta but not at Baghdad. The

chief factors to be considered in the causation of an epidemic are: (1) the virus (a leptospira ?); (2) the carrier—species, sex, nature of the breeding ground (larvae become infected by eating dejecta of infected flies and the imagos from these can transmit the fever only after a feed of blood), presence of infected man, temperature, humidity, etc.; (3) number of non-immunes as recipients. A leptospira has been found by several investigators in the short fevers of the sandfly type and Mediterranean dengue, but its etiological rôle is not quite certain. It has been cultivated but quickly loses its pathogenic property.

[The paper is very interesting and is complementary to others which the author has published on the same subject.]

P. W. B-S.

TEJERA (Enrique). i. **Las fiebres de Macuto y los insectos del género "Phlebotomus."** ii. **Algunas fuentes de anofelinos del Valle de Caracas.**—*Gac. Méd. de Caracas.* 1924. Mar. 31. Year 31. No. 6. pp. 83–84.

i. "Macuto fever" or "Mene Grande fever" is characterized by sudden onset of lassitude, chilliness, headache and backache, with a rapid rise of temperature to 40°–41°C. The pulse is slow, 60 or even 40 per minute, a rosy flush appears on the face and trunk, the conjunctivae are injected, the tongue is red at the edges and furred in the centre, the patient is irritable and sleepless, and there is almost complete anorexia with nausea, and, in some cases, vomiting. On the third or fourth day an eruption [not described] occurs on the face, neck, and dorsum of the hands and feet, and the temperature falls. There may be a slight rise again after four or five days, lasting for a few hours only. The author states that Phlebotomus is present in the district in large numbers and believes that the disease is merely sandfly fever.

ii. Larvae of Anopheles in considerable numbers have been found in named localities near Caracas.

H. Harold Scott.

MINKEWITSCH (Simferopol). [**Das sogenannte "Moskitofieber" der Krim.**] [The So-called Mosquito Fever of the Crimea.]—*Prophylaktische Medizin.* (russisch). 1923. Vol. 2. No. 1–2. [Summarized in *Arch. f. Schiffs- u. Trop. Hyg.* 1924. Aug. Vol. 28. No. 7. p. 307.]

The disease described, known in the Crimea as mosquito fever, is very common and corresponds in its clinical symptoms and epidemiology with pappataci fever. The absence of an exanthem, character of the fever, nature and location of the muscular pains, are against it being dengue. No record of the Diptera of the area is known to the author.

The old idea held 20 years ago by medical men was that the infection was acquired during the voyage.

P. W. B-S.

DE MELLO (Froilano) & DE SÁ (L. Braz). **Febres remitentes ou climáticas da India Portuguesa.**—*Bol. Ger. Med. e Farmacia.* Bastora. 1924. Apr. Ser. 9. No. 4. pp. 120–132.

Cases of prolonged fever are common in Portuguese India, and have been diagnosed as "climatic," "nervous." "remittent" and "double

summit" fever (febres de dois crescimentos). The symptoms, an analysis of which from a large number of cases is given, are strongly suggestive of one of the enteric group. Examinations were carried out bacteriologically on 73 patients. From 15 *B. typhosus* was isolated from the blood, and on 6 occasions one of the paratyphoid organisms; 2 were negative. Cultivation of the faeces yielded *B. typhosus* on 40 occasions, *B. paratyphosus* A once, while 9 were negative. The sera from 7 others agglutinated *B. typhosus* in high dilution. The mortality ascribed to this fever is 2,000 annually out of 600,000 inhabitants; thus the enteric group of fevers constitutes a serious sanitary problem in the Province.

H. Harold Scott.

Wheatland (F. T.). **Some Notes on Unclassified Fevers occurring in the North Queensland Coastal Regions.**—*Med. Jl. Australia.* 1924. May 17. 11th Year. Vol. 1. No. 20. (Supplement.) pp. 322–324. [3 refs.]

Two types are discussed—(1) Coastal fever, better known as Mossman fever, an account of which can be found in all modern text-books. It is a 21-day fever with headache, pain in the back and legs, enlargement of glands, and occasionally a macular rash. (2) Sarina or West Plane Creek fever. A disease most common in males working in the sugar-cane fields. It is a continued fever somewhat like typhoid but shorter, with headache and in severe cases delirium, a mottled rash all over the body, sometimes diarrheoa and enlarged glands.

The chief distinctions between the two are thus stated :—

	Coastal fever.	*Sarina fever.*
Onset	gradual	sudden
Rigors ...	uncommon ...	common
Bowels ...	constipated ...	occasional diarrhoea
Relapses ...	occur	none
Heart ...	responds to stimulation	does not respond
Mortality ...	1 per cent.	20–30 per cent.

They are not infectious and are probably transmitted by insects, affecting men working amongst timber and scrub.

P. W. B-S.

Williamson (J. B.). **A Possible Case of Tick Typhus.**—*Jl. Roy. Army Med. Corps.* 1924. Oct. Vol. 43. No. 4. pp. 291–292.

The author describes an interesting case from the Artillery Camp at Saugar, C.P., which was provisionally diagnosed "tick typhus," a disease very similar to Rocky Mountain fever. The pyrexia lasted about 14 days; the macular rash appeared on the sixth day and was well marked; there was also conjunctival congestion and sore throat. The case was at first thought to be syphilitic and "606" was given. The serum reactions were negative for all the typohid group and for syphilis. There was no evidence of Spironema or Rickettsia infection and no history of tick bites or louse infestation. Similar cases had occurred in the camp a year before, but the fever was evidently not infectious as the patient's tent companions were not attacked.

P. W. B-S.

DA COSTA (A. F. W.). **Four Cases of Spotted Fever at Nagpur.**—*Indian Med. Gaz.* 1924. Sept. Vol. 59. No. 9. pp. 450–452. With 4 charts.

The author describes four cases of a form of fourteen-day fever which occurred at Nagpur in November 1923. Three were in one family apparently unconnected with the fourth. Each had a typhus-like rash on the fourth to fifth day. All recovered. Blood reactions were negative to the typhoid group of organisms, and three gave positive Weil-Felix reactions at dilutions of 1/20. Provisionally the cases were classed as belonging to the typhus-like fevers, but in no instance could lice be incriminated.

P. W. B-S.

MACCORMICK (David D.). **Observaciones sobre la fiebre de Bucaramanga.**—*Report. de Med. y Cirug.* Bogotá. 1924. Apr. Vol. 15. No. 7. (No. 175). pp. 347–356.

Bucaramanga fever has been the subject of much dispute. Many cases exhibit an intense toxaemia, with jaundice, albuminuria, perhaps suppression of urine, and black vomit. Some of the local medical practitioners deny the contention of the Rockefeller Commission, sent out to study the condition, that it is yellow fever. The author maintains the view that the diseases are distinct. He has examined blood from 100 cases and failed to find the leptospira and inoculation of guineapigs has yielded persistently negative results. He states that he has always been able to obtain spirochaetes by withdrawal of 10 cc. of the patient's blood into citrated Ringer's solution, but that he has not succeeded in cultivating them. These spirochaetes are of varied size; the larger are present in cases exhibiting symptoms like those of yellow fever, the smaller in those who have neither jaundice nor albuminuria. The latter patients, however, often relapse, whereas the former do not. Further, agglutination of the *Leptospira icteroides* was not obtained with serum from the patients. The author seems to regard the disease as a variety of relapsing fever [see this *Bulletin*, Vol. 20, p. 911].

H. Harold Scott.

SLEEPING SICKNESS.

CARPENTER (G. D. Hale). **Report on an Investigation into the Epidemiology of Sleeping Sickness in Central Kavirondo, Kenya Colony.**—*Bull. Entom. Res.* 1924. Nov. Vol. 15. Part 2. pp. 187–208. With 1 fig. 1 folding map & 1 plate. [1 ref.]

FISKE had suggested that investigation of present conditions on the east coast of Lake Victoria in the central Kavirondo country would throw light on the etiology of the sleeping sickness and help reclamation of the abandoned territory in Uganda, and he further stated that it would be found that a number of *Glossina palpalis* represented by a catch of ten males per fly-boy per hour would be the limit of safety if there was a population of over thirty per square mile living in contact with the fly along the coast.

It was to test these theoretical conclusions and to obtain information on other points that the investigations recorded in this paper were undertaken.

The following summary and conclusions are given :—

"The epidemic of sleeping sickness in Central Kavirondo was introduced about 1903 from Usoga across a chain of islands, and finally from Mageta Island to the coast of Kadimu close by. Mageta was evacuated, and subsequent return of the population brought back the disease, leading to a second evacuation, second return, and renewal of the disease about 1920-21, leading to final evacuation two years ago.

"*Glossina palpalis* occurs plentifully along the 100 miles of coast examined, between the Sio River and the mouth of the Kavirondo Gulf, except just south of Sio, and in the neighbourhood of the mouths of the Yala and Nzoia Rivers. Ample evidence was obtained that non-mammalian blood is much preferred to that of the hippopotamus, which was the only source of mammalian blood, except man and cattle at some localities.

"No trypanosomes of mammalian type were found in 238 *palpalis* examined.

"*Glossina brevipalpis* occurs in the neighbourhood of Kadimu Bay frequenting the places where hippos sleep in the dense bush. In strong contradistinction from *palpalis*, they much prefer the blood of hippos to that of birds or reptiles. Ample evidence was obtained that in former days the population lived and cultivated along the lake shore in very much closer contact with *palpalis* than at present. The people of their own accord have retired from the lake shore, and only at a few localities is there contact with *palpalis* at watering and landing places, but a great deal of fishing is done all along the coast. There is a desire to return nearer to the water, and this will need watching lest the breadth of contact between fly and people be raised to danger-point. It must be remembered that absence of population for many years has resulted in very dense growth of bush in the country within a mile of the water, and that *palpalis* is possibly even more numerous now than formerly. In view of the absence of *palpalis* behind broad belts of papyrus the population should be encouraged to return to those parts in preference to others, *e.g.*, the northern part of Kadimu Bay and the bay running eastwards from the south of Kadimu Bay. Elsewhere safety may be conferred on the general population by clearing all landing and watering places for 200 yards along the coast on each side of the actual landing, and for 50 yards back from the water. To ensure that infected fishermen do not carry the disease from one place to another a system of licences, only valid after certification that the applicant is free from signs of sleeping sickness, could be adopted.

"It was not found practicable to examine the lake shore population systematically, nor was it considered expedient, for several reasons, to clinch diagnosis by gland puncture. After the existence of trypanosomes in the first case had been thus proved diagnosis depended upon palpation of cervical and axillary glands. No cases were seen so advanced as to be obvious to the eye alone, and the majority of the several cases diagnosed seemed in their own opinion in good health. Only two of the emigrants from Mageta Island showed tremors of the tongue and some degree of wasting. So far as could be ascertained by enquiry, the disease is quiescent at the present time, the only deaths reported being among the Mageta people who had come away two years ago.

"The presence of these infected people in a settlement on the mainland in close contact with Jaluo natives of whom none have acquired the disease is strong evidence that agents other than *Glossina* are not of material importance in the epidemiology of the disease. It was thought possible at one locality named Ndiwo, where *Glossina* was reported to be unknown, that sleeping sickness must have been carried by some other agent, but close attention to local conditions and their history in the past showed that there was ample evidence that at the time of the epidemic *palpalis* was probably there in adequate numbers, although barely able to exist at the present day.

"The population was found to be living so as to be in contact with *palpalis* at landing and watering places in 20 localities along the 100 miles of coast examined, but in three of these (24, 49, 56) the degree of contact was so doubtful that it is better not to consider them. In one locality (Maresa) the cases were, with one exception, probably old infections before leaving Mageta Isle, or else due to recent visits to that Island; the exception was probably infected owing to residence in a densely fly infested area close to the water during the famine period and may very possibly have been infected by the cyclical method.

"In three of the other localities where infection was discovered (these are all italicized in the list of localities), the relations between the population within 1½-2 miles of the water, estimated as adults per square mile (P), and the number of fly estimated by the catch of males per boy hour (F), are given below as P : F.

Locality	14	P : F :: 50 : 24.
,,	61	P : F :: 54 : 20.
,,	64	P : F :: 81 : 16.
Mageta Isle		P : F :: 42 : 30.

"The data for Mageta Isle are those of the last epidemic, which began probably in 1919, and was seen by Dr. Beven in 1921-22. In Locality 66 the infection was probably not acquired at the general landing and watering place.

"The four cases above cited therefore seem to show that broad contact between a population of density over 40 per square mile and *palpalis* at the rate of more than 15 males per boy per hour conduces to infection by *T. gambiense*."

[It has to be noted that the dates given by Carpenter in his account of the history of the great epidemic in Central Kavirondo do not agree with those given in 1903 by CHRISTY.* CHRISTY estimated the dates at which the epidemic reached the various places to be as follows :—

Some part of Busoga or Buvuma Island, 1896 (Dr. Hodges); Kampala (Mengo), February, 1901; Southern Kavirondo, October, 1901;

* CHRISTY (Cuthbert). The Epidemiology and Etiology of Sleeping Sickness in Equatorial East Africa, with Clinical Observations. *Repts. of the Sleeping Sickness Commission. Royal Society.* 1903. Nov. No. III (6). pp. 3–32. With 5 maps and 4 plates.

Sese Islands, December, 1901; Kasagunga, January, 1902; Lusinga Island, March, 1902; Kasachonga (Homa), March, 1902; Kisengere, ? May, 1902; German East Africa, September, 1902.].

W. Yorke.

AUGAGNEUR (Victor). **Le mouvement de la population en Afrique équatoriale française. Influence de la maladie du sommeil.**—*Rev. d'Hygiene*. 1924. June. Vol. 46. No. 6. pp. 509–540.

This paper deals in an extended form with the matter already discussed in a previous paper and noticed in this *Bulletin* [Vol. 21, p. 373].

1. There is nothing to support the belief that the population of French Equatorial Africa is in a state of diminution, especially since the commencement of French colonization.

2. The climatic conditions, the inadequate dietetic resources, the total absence of hygiene and of all foresight have for all time and especially before colonization, limited the growth of the population.

3. The numerous and conscientious observations made with meritorious zeal by the medical men who have studied trypanosomiasis do not permit of the formation of any definite opinion :—

(*a*) On the death rate of trypanosomiasis in relation to the total population.

(*b*) On the mortality in trypanosomiasis.

(*c*) On the spontaneous evolution of the epidemic.

4. It appears that after an initial attack en masse of a population hitherto free, the epidemic has exhausted a portion of its pristine power.

5. The influence of trypanosomiasis on the birth rate is not established.

6. The solution of these questions remains undecided and can be obtained only by examination at intervals of the total population of a given area, in which the death rate and the mortality from various causes are constantly supervised and determined.

The author, who is Governor-General of French Equatorial Africa, has instructed the Director of the Sanitary Service to devise an organization whereby a precise study of the progress and effects of trypanosomiasis may be made.

W. Y.

BULLETIN DE LA SOCIÉTÉ DE PATHOLOGIE EXOTIQUE. 1924. June 11. Vol. 17. No. 6. pp. 424–433.—**Prophylaxie de la maladie du sommeil.**

In this report a Committee appointed by the Société de Pathologie Exotique and consisting of ABBATUCCI, BOYÉ, BRUMPT, CALMETTE, CLAPIER, GONGIEU, GUILLET, JOYEUX, LEGER, MARCHOUX, G. MARTIN, L. MARTIN, MESNIL, NATTAN-LARRIER, OUZILLEAU, ROUBAUD, and the Governor LAMBLIN record the modifications which they consider should now be made in the recommendations contained in the previous report of 1920 [this *Bulletin*, Vol. 16, p. 362].

The following are the resolutions :—

1. Diagnosis should depend on the microscope and not be merely clinical; in practice it should be established by examination of gland juice, but good organization should allow also of the blood centrifugation method and of lumbar puncture.

2. The population of the various regions should be visited periodically and diagnosis should be made as early as possible if only because it permits of more efficacious treatment.

3. For cases in the first stage 6 injections of atoxyl, each 1·5 cgm. to 2·0 cgm. per kilo of body weight should be given at intervals of 10 days every year. Such treatments occupy 50 days and give only 6 per cent. of relapses in 12 months. Sterilization of cases in the second stage must be attempted with circumspection.

4. The present prophylactic sectors are too large and they should be subdivided.

5. This demands an increase in the number of doctors and they should be encouraged both morally and financially in a measure commensurate with their dangerous task. An increase in the number of European hospital assistants is likewise necessary.

6. Native hospital assistants should only be used prudently and should be under strict supervision.

7. The mobility of the medical personnel should be increased and facilitated by modern means of transport.

8. The attention of the Administration should be urgently drawn to the fact that agricultural and administrative measures are just as important as therapeutic prophylaxis, and without them the latter remain aleatory and uncertain. The Society insists once more that ideal prophylaxis consists in :—

a. Rendering each place of concourse healthy by protecting it from the sources of infection (tsetses and mosquitoes).

b. Reassembling, on routes of communication readily accessible, native agglomerations dispersed in the equatorial forest and difficult of supervision.

c. Improving the dietary (notably by assisting in the importation of dried foods) and the general welfare of the population.

9. The Administration and Sanitary Service should co-operate in arranging a programme and in determining the regions which should for various reasons benefit first from an intensified prophylactic campaign.

10. An obligatory course of instruction relating to prophylaxis of human and animal trypanosomiasis should be given at the Colonial School to students destined for the African tropical Colonies. The administrators of the infected regions should receive practical instruction on the voyage to Brazzaville, Libreville or Douala.

11. With the object of facilitating prophylaxis the doctor should be able to appeal for the co-operation of Europeans (officials, officers, missionaries and colonists).

W. Y.

BLANCHARD (M.) & LAIGRET (J.). **Sur la prophylaxie de la maladie du sommeil. À propos de la Mission Schwetz au Congo Belge.**— *Bull. Soc. Path. Exot.* 1924. June 11. Vol. 17. No. 6. pp. 485–501. [8 refs.]

The authors state that the Sleeping Sickness Commission directed by SCHWETZ in the Kwango district of the Belgian Congo [this *Bulletin*, Vol. 15, p. 381 and Vol. 21, p. 371] laid down certain principles of organization and methods of diagnosis and treatment which deviate notably from those followed by them in their work in French Equatorial Africa. In this paper they consider : (1) The methods of diagnosis

employed by SCHWETZ; (2) his treatment, and, more particularly, the accidents due to the use of atoxyl which he records: and (3) the organization of SCHWETZ's mission, its functioning and the lessons which can be drawn for work in French territory.

With regard to SCHWETZ's contention that gland palpation alone, without puncture or blood examination, is sufficient to diagnose trypanosomiasis, the authors definitely disagree. The chief argument employed by SCHWETZ in support of his method is that the glands in trypanosomiasis are absolutely characteristic and totally different from those found in syphilis, tuberculosis, or inflammatory conditions. The authors agree that this is so in general, but point out that trypanosomes may sometimes be found in atypical glands and, on the contrary, typical glands may be present in cases not infected with trypanosomiasis.

SCHWETZ holds the view that microscopic diagnosis is uncertain in negative cases, but Blanchard and Laigret do not agree with this; they consider that with the means of investigation available, viz., microscopic examination of gland juice, the blood centrifugation method or, in certain cases, spinal puncture, the result obtained at the first examination can be regarded as final. Again, in this connexion the authors state that in treated cases the enlarged glands disappear and disappear finally, even though the patients pass into the second stage of the disease with the appearance of parasites in the cerebrospinal fluid.

Summarizing their views on the question of diagnosis of trypanosomiasis in the bush, Blanchard and Laigret believe that the method of gland palpation should only be regarded as a *pis aller*. Only the microscopic method of investigation can be regarded as certain and fortunately in trypanosomiasis the examination of gland juice and centrifuged blood are relatively simple.

With reference to the question how infected natives should be treated in the bush, the authors remark that SCHWETZ used two drugs—atoxyl and emetic. The former was employed in the massive doses of 1 gm. for adults and ·5 gm. for children. Blanchard and Laigret state that these are the only efficacious doses, that they themselves have frequently used 1·2 gm. in adults and ·6 gm. in children: such doses are well tolerated by persons whose spinal fluid is normal. They ascribe the accidents recorded by SCHWETZ as due either to a poor quality of drug or to the fact that certain of SCHWETZ's cases were in the second stage of the disease, it being impossible to exclude all such cases in absence of spinal puncture. Subcutaneous injections are, in the authors' opinion, to be preferred to the intravenous injections recommended by SCHWETZ.

Blanchard and Laigret do not care for emetic as a remedy for use in the field, the lesions produced by faulty technique are difficult to deal with and they consider that, although it is an excellent trypanocide in animals, it is much less active in man.

In the French territory, the prophylactic courses consist of two injections at 8 to 10 days' interval, whereas SCHWETZ gives ten injections. The French method is based on the view that the doctor should travel as rapidly as possible over an extensive area and not attempt at obtaining cures. The object is to repeat the course of treatment every 6 months or even every 3 months, but in practice in most of the districts it is only possible to renew the treatment once a year. Investigation has shown the inadequacy of the French method.

it has cured a certain amount of cases as perhaps would also a single injection, but the great majority of patients relapse. Experience at Brazzaville has shown that a course of 6 massive injections gives only 6 per cent. of relapses after a year's post-treatment observation, and that 90 per cent. of the cases appear to be cured, whilst after a prophylactic course of only 2 injections 29 per cent. are found not to be cured after a year's observation, and 17 per cent. have relapsed within six months. The authors believe that the French procedure is erroneous and that the organization should be remodelled in directions which they indicate at length.

W. Y.

TANON (L.) & JAMOT (E.). **La maladie du sommeil au Cameroun.**—*Presse Méd.* 1924. Aug. 23. Vol. 32. No. 68. (Supplément) pp. 1427–1431. With 1 fig.

Although the French found the situation as regards sleeping sickness to be aggravated at the end of the war, they have been able to devise an organization which has enabled them to check the epidemic and even in certain places to cause it to retrogress. This paper deals with the work being done in the Haut-Nyong sector created in 1920, and comprising the sub-divisions of Akoloninga and Abong M'Bang on the Nyong and the sub-division of Doumé. The medical centre is at Ayos in the most heavily infected part of the sector. The region north-east of Doumé has been made into a sub-sector confided to the care of one doctor and two hospital assistants—the one stationed at Garoua and the other at Douala.

The medical centre at Ayos is excellently situated on a plateau 600–700 m. high; the temperature varies between 22°C. and 25°C. and the prevailing winds render it pleasant. A description is given of the medical staff, of the general organization, and of the prophylactic measures which are being adopted. The treatment used chiefly is the administration of atoxyl, which cures the patients in the first stage of the disease and renders harmless the most advanced cases. The first injection consists of about 1·5 cgm. per kilo of body weight (about 1 gm. for an adult). This dose suffices to cause parasites to disappear from the blood for several months, and then the patient should receive (HUOT) ·5 cgm. per kilo every seven days until he has had 15 to 20 injections, but in practice this is impossible owing to the limited staff available. One has to content oneself with giving injections at monthly intervals or as often as possible, according to the method recommended by AUBERT—4 injections of atoxyl each of 1 gm. at 8-day intervals supported by two injections of novarsenobenzol, which is sometimes replaced by emetic.

By this means, it is estimated, the numbers of carriers is reduced by 90 per cent., and many of those in the first stage are cured. Since the commencement of operations in January, 1920, about 100,000 natives have been examined and 30,000 recognized as infected. The infectivity varies in the different regions—at Abong M'Bang it is 26 per cent., at Akoloninga 48 per cent., Doumé 8 per cent., and in the other places less. The death rate has fallen considerably and the foci at Akoloninga and Doumé are on the way to extinction.

W. Y.

KOCH (Robert). **Ein Tagebuch von Robert Koch während seiner deutschostafrikanischen Schlafkrankheits-expedition i. J. 1906-07. Vorbemerkungen und Erläuterungen von Prof. F.** KLEINE. [Robert Koch's Diary during the Sleeping Sickness Expedition to German East Africa in 1906–07].—*Deut. Med. Woch.* 1924. Jan. 4, 11, 18, 25, Feb. 1, 8, 15, & 22. Vol. 50. Nos. 1, 2, 3, 4, 5, 6, 7 & 8. pp. 21–24 ; 55–56. With 1 text fig. ; pp. 88–89. With 2 text figs, ; pp. 121–122. With 1 text fig. ; pp. 152–153 ; 184–185 ; 216–217. With 1 text fig. ; pp. 248–249.

This diary is edited by Professor F. KLEINE, who gives a short account of the circumstances in which the diary was kept. In 1906 the German Government sent to East Africa a medical expedition for the study of sleeping sickness under the leadership of Professor Koch. He was accompanied by his wife, Professor Beck and Professor KLEINE. In Africa three other medical men joined him.

At that time the epidemiology of sleeping sickness was still not altogether clear ; the mode of infection by *Glossina palpalis* had not been explained, although BRUCE had found this fly to be the carrier of *T. gambiense.* Also, *G. palpalis* was at that time regarded as the sole carrier of the disease. Koch's aim was to discover more about the bionomics, especially the food supply, of *G. palpalis,* and to find out whether man was the only host of *T. gambiense.* The ultimate aim of the expedition was that of finding practical methods of prophylaxis against sleeping sickness. Koch placed great hopes in the blood sterilizing properties of atoxyl, and even when these hopes were not altogether realized, believed that the only satisfactory means of stamping out the disease would be by the discovery of a drug that would keep the blood of the infected free of trypanosomes for a sufficient length of time.

KLEINE, who was himself a member of the expedition, points out that the diary is quite impersonal and contains no remarks about any of the members of the expedition, or any hint of Koch's personal feelings whether of elation or disappointment. No mention is made of the difficulties he met with, or of the privations he had to undergo. The entries are concise statements of fact.

Koch's official report of this expedition was published in the *Deut. Med. Woch.* in 1906 and 1907 and also in his collected works, Vol. II. The diary itself is a small note-book with the entries in pencil and is in the possession of his widow.

W. Y.

TODD (John L.). **After-History of African Trypanosomiasis.** 1911–1924. [Correspondence.]—*Brit. Med. Jl.* ,1924. Aug. 16. p. 298.

Todd writes that from letters he has received from the Gambia, it may be concluded that 8 natives, who were found by WOLBACH and himself* to be infected with trypanosomes in 1911, were in good health in 1920, and that one of these cases—nothing is known of the others—was still alive in 1924, and had never shown a sign of "sleeping sickness." The author continues :—

" The history of these cases permits the definite statement that either human trypanosomiasis may be an extraordinarily chronic infection or

* *Ann. Trop. Med. & Parasit.* 1911. Vol. 5. pp. 245–86; see *Sleeping Sickness Bulletin,* Vol. 3, p 336.

that spontaneous recovery from the disease may not uncommonly occur in African natives of the Gambia. The situation is one which can be clarified by the continued observation and examination of cases over long periods. To do so is, therefore, a work which can only be undertaken by a permanent authority."

W. Y.

CHAGAS (Carlos). **American Trypanosomiasis. Study of the Parasite and of the Transmitting Insect.**—*Proc. Inst. of Med. Chicago.* 1921. Vol. 3. No. 4. pp. 220–242.

This is a summary of the present state of knowledge regarding American trypanosomiasis, and requires little notice here. With regard to the development of the parasite in the invertebrate host, Chagas holds the view that the forms in the hind gut do not constitute the last stage of evolution of the trypanosome; these are found in the salivary glands. He writes:—

"This discovery has been a difficult one, and up to the present has been realized rarely; however, its importance is not less as being demonstrative of the exact mechanism of transmission of the parasite. In the salivary glands the parasite has been seen in the interstitial tissue between the glandular cells. Here it is elongated, with a rodlike nucleus placed longitudinally, with much smaller dimensions than the forms of the hind-gut, with which it cannot be confused. This is the final stage of the exogenous cycle of the parasite equivalent to the sporozoites of malaria and of other protozoa transmitted by hematophages."

In contradistinction to the views of BRUMPT and others, Chagas believes that,

"As a result of decisive experiments and observations we can express the firm opinion that the natural transmission of *Trypanosoma cruzi* is accomplished by the bite of the triatome. The feces may constitute an accidental factor in the transmission of the parasite when they are deposited directly on the mucous membranes; however, if the defecations of the insect take place on the intact skin the penetration of the parasite does not occur, principally on account of the death of the flagellates by the desiccation of the feces."

W. Y.

i. VILLELA (E.). **Paralysie expérimentale chez le chien par le** *Trypanosoma cruzi.*—*C. R. Soc. Biol.* 1924. Oct. 31. Vol. 91. No. 30. pp. 979–983. With 4 figs.

ii. CAMPOS (Ernesto de Souza). **Sur la paraplégie des animaux infectés expérimentalement par le** *Trypanosoma cruzi* **(Chagas 1909).**—*Ibid.* pp. 984–985.

i. A strain of *T. cruzi* obtained from a naturally infected armadillo proved very virulent when passed through a series of dogs, the animals dying in from 25 to 50 days after inoculation. The frequence of nervous symptoms was very interesting—staggering, tonic and clonic convulsions, followed sometimes by prolonged coma and paresis of the limbs. In the series of dogs, palsies appeared regularly in about 30 days. Other interesting points were the frequence of keratitis and the localization of the parasite in the nervous system. An account is given of the pathological changes met with, and attention is drawn to the fact that infiltration of the leptomeninges and of the arterioles similar to that noted in other trypanosomiases was the rule.

In a note at the end of the paper the author records that one of the animals gave birth to nine pups, all of which were still-born and some very macerated. In five of them *T. cruzi* was found in the blood and the heart showed leishmaniform agglomerations; in the brain foci of encephalitis were found. This observation is interesting and is in accordance with the numerous cases of congenital encephalitis seen in Chagas' disease.

ii. Details are given of a number of experimental animals—5 dogs and 2 rabbits—which exhibited nervous symptoms, similar to those observed by VILLELA, after inoculation with *T. cruzi*.

W. Y.

PINTO (Cesar). **Sobre um Reduvideo transmissor do "*Trypanosoma cruzi*."** *Sciencia Medica.* 1924. Aug. 31. Vol. 2. No. 8. pp. 426–427. With 1 fig.

In 1872 STÅL described *Rhodnius pictipes* as existing in the State of Rio Grande do Norte, and DA MATTA found it also in Manáos (State of Amazonas). NEIVA and Pinto in 1923 showed that it is naturally parasitized by *Trypanosoma cruzi* and that it can act as a transmitter of this protozoon. The cycle of evolution under laboratory conditions occupies just over a year; oviposition occurred on April 30th, 1923, the larva emerged on May 14th, and the adult on May 10th, 1924.

H. Harold Scott.

BRENNAN (C. H.). **The Serum-Aldehyde Test as applied to Trypanosomiasis.**—*Kenya Med. Jl.* 1924. June. Vol. 1. No. 3. pp. 79–81.

The author applied the serum aldehyde test in 10 cases of trypanosomiasis and in 7 normal persons; all the former gave a positive reaction and all the latter were negative.

W. Y.

VAN DEN BRANDEN (F.). & VAN HOOF (L.). **Le "Bayer 205" dans le traitement de la Trypanosomiase humaine.**—*Ann. Soc. Belge de Méd. Trop.* 1924. Nov. Vol. 4. No. 2. pp. 205–230. [2 refs.]

The patients treated by the authors are grouped in two categories: (1) those in the first stage of the disease, with fever, enlarged glands and less than 15 lymphocytes per cmm. in the spinal fluid, and (2) those in the second stage exhibiting a meningeal reaction indicative of profound changes in the nervous system.

It was found that "Bayer 205" is an energetic trypanocide and that the action is slow. Sterilization of the blood is more rapid in patients injected intravenously than in those injected intramuscularly or subcutaneously. In patients in the first stage of the disease a course of 3·5 gm. (4 injections, the first 0·5 gm. and the others 1 gm. at 6–8 day intervals) produced a sterilization of the blood lasting 5 to 16 months in 12 of the 19 treated; of the remaining seven cases one died, one disappeared, and the other five relapsed.

The drug no more cured patients in the second stage of the disease than does atoxyl and the clinical benefit resulting is less marked than from the latter drug. In all, 25 such cases were treated; in 13 the drug was given intravenously, in 3 it was given both intravenously and intrathecally and in the remaining 9 intravenously and the

"Bayer 205" serum injected intrathecally. Of the 13 in the first group 6 are dead within the observation period mentioned, 1 has relapsed, and the other 6 have remained in good general condition with negative blood, but the lymphocytosis in the spinal fluid has increased. The results obtained in the 3 cases in which the drug was injected intrathecally were very unsatisfactory and showed that such a procedure is attended by grave risk to the patient; the therapeutic value is apparently nil. It was found that the injection of "Bayer 205" serum intrathecally is not irritating to the meninges, but that the combination of this with intravenous injection of the drug is not superior to intravenous injection alone.

The sterilization of the blood produced by a single injection of 1 gm. of the drug may be very long in patients in the second stage of the disease, although their infection persists; and in this respect "Bayer 205" is a therapeutic agent of very great value.

The authors noted as an immediate reaction in the patients treated a cutaneous eruption in the form of urticarial plaques and a herpetic eruption about the lips, and as a later reaction renal irritation proceeding in certain cases to nephritis.

The paper concludes with five tables showing, respectively, the speed with which sterilization of the gland juice occurs, the result of treating patients in the first stage of the disease with 3·5 gm. of the drug, and the results of treatment in the second stage of the disease (1) with intravenous injections of the drug, (2) with intrathecal injections of the drug, and (3) with intravenous injection combined with intrathecal injection of "Bayer 205" serum. Information is given regarding the dose of the drug administered, the state of the cerebrospinal fluid before and after treatment, whether or not a relapse occurred, the state of the urine, and the clinical effect of the treatment, etc.

W. Y.

Tanon (L.) & Jamot (E.). **Essai de traitement de la maladie du sommeil au Cameroun par le "Bayer 205." Action sur les parasites. Action sur les reins et le foie.**— *Ann. Parasit. Humaine et Comparée.* 1924. Oct. Vol. 2. No. 4. pp. 327–334.

The patients came from a village of Abong-M'Bang. Thirty-nine were chosen for treatment, all of whom presented signs of trypanosomiasis and in whom examination of the gland juice and blood revealed the presence of trypanosomes. The patients were divided into the following four classes:—

1. Those who exhibited all the clinical signs of the first stage with trypanosomes in the blood and cerebrospinal fluid normal (13 patients). *First stage.*

2. Those who had a slight infection of the meninges indicated by a slight lymphocytosis and a little excess of albumose (12 patients). *Commencement of the second stage.*

3. Those who had a marked lymphocytosis with excess of albumose and trypanosomes in the cerebrospinal fluid (6 patients). *Second stage confirmed.*

4. Those who exhibited a marked degree of emaciation, cachexia, somnolence and the nervous disturbances which characterize the *third stage* (6 patients).

The patients were of both sexes and varied in age from 6 to 40 years.

The amount of the drug given to each patient was about 3 gm. and it was administered in one of two ways, either in three doses of ·5 gm., 1 gm. and 1·5 gm., respectively, at intervals of two days, or in two large doses of 1·5 gm. each at an 8-day interval. The children were given smaller quantities, those of from 6 to 10 years getting ·2 gm. and ·4 gm., those of 10 to 13 years ·5 gm., ·7 gm. and 1·0 gm. The earlier injections were given subcutaneously and the later intravenously. In two cases it was given intrathecally with fatal results.

The trypanosomes began to disappear from the blood after 3 hours, after 18 hours they could not be found in the great majority of the patients and in none could they be found after 24 hours. In 30 of the patients there was no relapse in 9 months, but in 7 relapses were observed, for the most part transitory. One case relapsed on the 24th day, but on the 26th day the parasites disappeared permanently; one case relapsed on the 17th day and parasites persisted for 4 months and then disappeared; two other cases relapsed on the 17th day and trypanosomes persisted for 5 months and then disappeared; one case relapsed after 5 months and another after 6 months, parasites persisting for a month and then disappearing; and in the last case a relapse occurred after 1½ months, parasites persisted for 15 days and then disappeared to reappear again after 2 months.

The trypanosomes are not then all destroyed immediately, but may reappear after intervals, again to disappear; only exceptionally do they reappear to persist. The autoagglutination of the erythrocytes is in no way modified.

With regard to the effect on the cerebrospinal fluid the authors state that this remains unchanged; the trypanosomes persist, the lymphocytosis and hyperalbumosis is uninfluenced.

The drug always produces albuminuria, which varies in intensity. This is dependent on a direct action of the drug on the renal epithelium; the albuminuria persists for several months, is augmented by fatigue, and may even lead to a manifestation of renal insufficiency. An account is given of the pathological lesions found in two fatal cases.

W. Y.

Luengo (E.) & de Buen (S.). **Pouvoir trypanolytique du sérum d'un malade traité par le "Bayer 205."**—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 28. pp. 825–827.

The authors have examined Mayer's conclusions [see this *Bulletin*, Vol. 17. pp. 334–5] that the serum of sleeping sickness patients treated with "Bayer 205" contains the drug for long periods, that it exhibits a curative action for infected animals and also a preventive action for the patients themselves, and finally they have enquired whether these properties are exhibited by healthy animals to which the drug has been given.

They used the serum of a patient who had received a total of 8 gm. of "Bayer 205" in three series at intervals of 15 days; the last injection was given 1½ months previously. The day before the removal of the serum the patient had a slight rise of temperature accompanied by the appearance of trypanosomes in the peripheral blood, but parasites were not found on the day of withdrawal of the serum or on the following day. About 15 days after each series of injections he had a

slight rise of temperature lasting about two days and accompanied by the appearance of trypanosomes in the blood. Inoculation of the blood into a guineapig and dog was, however, negative.

Mixtures of ordinary bouillon with the various sera, solutions of the drug, and the blood of a heavily infected guineapig were injected into the peritoneal cavity of white mice and drops subsequently withdrawn and examined after stated intervals; as a control *in vitro* observations were also made.

The authors conclude from their experiments that the trypanocidal action of the treated patient's serum was not due solely to the action of the contained drug, but to properties acquired by the serum as the result of destruction of the trypanosomes. The trypanocidal activity of the serum undergoes certain oscillations, thus accounting for the transient appearance of parasites in the blood of the patient at certain intervals followed by their spontaneous disappearance.

If the existence of these processes of immunization are proved it will be necessary, in order to cure trypanosomiasis with "Bayer 205," to proceed in such a manner as to excite this action and not to aim at a chemical sterilization, but rather at a progressive destruction of the trypanosomes by a sort of auto-vaccination resulting from the proper spacing of the injections of the drug.

W. Y.

Stones (R. Y.). **A Case of Sleeping Sickness treated with Bayer 205.**—*Kenya Med. Jl.* 1924. Oct. Vol. 1. No. 7. pp. 209–212.

The patient, a native, was admitted to hospital with a diagnosis of anaemia of unknown cause on 29 March, 1924. Examination of the stools showed the presence of *Taenia saginata*; treatment was administered, but was not successful. Examination of the blood was negative and small doses of neosalvarsan were then given. Later, as there was no improvement in the anaemia, the patient received a course of arsenic. On 25 April the diagnosis was reconsidered, two small glands were noticed and, on puncture, trypanosomes were discovered. A course of tartar emetic was then given, but on 10 May trypanosomes were still present in the gland juice, but were not found in the blood. On 13 May 1 gm. of Bayer 205 was given and the dose repeated on 19 May; on 21 May trypanosomes were found in the gland juice and albumen was detected in the urine. On 29 May the patient had improved and only a cloud of albumen was found in the urine; on 5 June ·5 gm. Bayer 205 was given, on 13 June the gland juice was negative and the urine contained albumen, on 27 June a further injection of 1 gm. of Bayer 205 was given and the patient collapsed; he was revived by stimulants, but suppression of urine set in and he died in about 40 hours.

W. Y.

Letonturier, de Marqueissac & Jamot. **Essai du tryparsamide dans la trypanosomiase humaine à virus gambiense.**—*Bull. Soc. Path. Exot.* 1924. Oct. 8. Vol. 17. No. 8. pp. 692–703.

Details are given concerning fourteen cases of trypanosomiasis treated with tryparsamide; of these one was in the first stage of the disease, 3 at the beginning of the second stage, 6 definitely in the second stage, 3 in the third stage and 1 was a very advanced demented case.

Each patient received only a single series of subcutaneous injections (owing to the small quantity of the drug available); the dose given was ·04 gm. per kilo of body weight and was repeated every 6 or 7 days; the total dose varied from 10 gm. to 21·5 gm.

Seven of the patients developed albuminuria in the course of treatment; in 5 it was transient, but in 2 it was severe and caused the treatment to be interrupted. No serious ocular troubles were observed. Subcutaneous injections (10 per cent. solutions) caused neither pain nor irritation; one case developed an abscess, but this was attributed to imperfect sterilization of the syringe. Thick blood films were examined regularly during treatment and the subsequent sojourn of the patients in camp. Only 2 cases relapsed, one after 19 days and the other after 15 days. [It must be noted, however, that the post-treatment observation period was at most only a few months]. The treatment, however, led to a pronounced reduction of the cells in the cerebrospinal fluid of the patients in the second stage of the disease and to a marked amelioration of the nervous symptoms in those in the third stage. All the patients have considerably improved.

W. Y.

CHESTERMAN (Clement C.). **Tryparsamide in Sleeping Sickness. II.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1924. June 19. Vol. 18. No. 3. pp. 131–137. [7 refs.]

This paper gives later information regarding the fate of the 40 cases of sleeping sickness—all advanced and in the later stages of the disease—treated with tryparsamide [see this *Bulletin*, Vol. 20, p. 694].

As in the former paper the cases are considered under three headings:—

1. Twenty-four which had had no previous treatment.
2. Ten which had been treated previously with atoxyl, tartar emetic, etc.
3. Five of 6 patients who had survived treatment by intrathecal serum (MARSHALL'S treatment).

Details regarding the fate of the 24 cases belonging to the first group are given in a table wherein is recorded the amount of tryparsamide given (from 10 to 28 gms.), the condition of the spinal fluid before and after treatment and the result and length of post-treatment observations. In 5 of the cases an obviously excellent clinical condition was confirmed by the discovery of a normal cerebrospinal fluid 22 to 29 months after treatment. The condition of the cerebrospinal fluid of these 5 cases before treatment was as follows:—Case 40, no record; Case 73, 470 cells + tryps.; Case 113, 420 cells − tryps.; Case 115, 540 cells + tryps.; Case 150, 760 cells + tryps. One case (No. 72) was seen on itineration and was in excellent health; one (No. 212) was also in good condition after 20 months, the blood was negative (triple centrifugation) and the cerebrospinal fluid contained 12 cells as against 170 before treatment. Two cases (Nos. 146 and 203) are reported to be well and one (No. 208) has disappeared. The remaining 14 uncured cases fall into 2 categories, viz., those which were discharged after the first course while the cerebrospinal fluid was still not normal, *i.e.*, immediate failures, and those in which the cell content was normal at that time, *i.e.*, immediate successes. The former are referred to as non-cures and the latter as relapses. Of the 5 non-cures (Nos. 131,

136, 157, 163 and 170) Nos. 131 and 136 were given weekly 1 gm. and 2 gm. doses respectively, and these doses are now known to be inadequate; No. 157 attended very irregularly and received only 2 gm. doses; No. 163 evidently should have received a second course, as he tolerated the drug well and was not clear after 24 grammes. Of the 9 relapse cases (Nos. 44, 45, 138, 139, 165, 171, 173, 174 and 199) three apparently received too small a dose of the drug.

Briefly the single course of treatment, which in many of the 24 cases was undoubtedly inadequate, has resulted, after approximately 2 years' average observation, in 9 (37·5 per cent.) apparent cures, 5 (21 per cent.) non-cures—2 being dead, 9 (37·5 per cent.) relapses—3 being dead and 1 (4 per cent.) untraced.

The author states that the only results with which these can be compared are those recorded by VAN DEN BRANDEN and VAN HOOF who followed up the cases originally treated by PEARCE at Leopoldville [this *Bulletin*, Vol. 21, p. 376]. Of the 35 patients who shewed altered cerebrospinal fluid before treatment, 16 (45·7 per cent.) were still normal and 19 (54·3 per cent.) were not normal after an average observation period of 7 months.

With regard to the second group of ten cases which had previously been treated with atoxyl, tartar emetic, etc. and in which these drugs had ceased to have any beneficial effect, all showed clinical improvement after tryparsamide, but as was predicted in the former report, 7 of the 10 relapsed and 4 are dead. The author explains this on the hypothesis that the trypanosomes had become arsenic-fast, and furthermore because in certain cases it was impossible to administer suitable doses on account of pre-existing visual troubles. Details are given regarding the 3 which have not relapsed which are very encouraging.

The last group of cases comprise 6 treated by the intrathecal serum method of MARSHALL; all had relapses shortly afterwards and 2 had died before further treatment could be given. Of the 4 which survived and were treated by tryparsamide 3 are in excellent health and 1 is still receiving the drug.

The following summary is given :—

"Fifteen out of thirty-seven patients, *i.e.*, 40·5 per cent., have remained well and without sign of relapse for periods averaging over two years from the end of a single course of treatment. Without exception they had all exhibited marked symptoms of involvement of the central nervous system, confirmed by an average cell content of the cerebrospinal fluid before treatment of 630 cells per c.mm. and the detection there of trypanosomes in six cases. Two or three were unable to walk, one was incontinent, and all long had passed the stage when there is any hope to be entertained of a cure by atoxyl and other drugs.

"The failures are due, in many instances, to faulty or insufficient dosage, which did not, by any means, always result from a fear of amblyopia, although this factor operated in some cases.

"The outlook is distinctly hopeful that one will, with the experience gained, be able to procure a greater percentage of immediate successes, and, given an opportunity for the administration of a second course shortly after the first, be able to prevent what appear to be true relapses. I am convinced that the curative power of tryparsamide in nervous infections is superior to that of 'Bayer 205.' Moreover, the high price of that drug ($15 for 10 grammes), exactly ten times as expensive for a single course as tryparsamide, will make it impossible to use on a large scale in Belgian Congo. The danger of nephritis which it causes is more serious and less easily detected in its early stages by the partially trained

white or black sanitary agent, than is the amblyopia which may ensue during the use of tryparsamide."

[The author is to be congratulated on this excellent paper. Whilst there are available innumerable records of the immediate effect of drugs on groups of sleeping sickness cases, there are remarkably few which throw light on the final fate of treated cases. It is to be hoped that it will be possible still further to observe these cases and that the author will in the course of another year or two publish further information regarding them.]

W. Y.

RAIZISS (George W.). SEVERAC (M.) & MOETSCH (John). **The Chemotherapy of Sulpharsphenamin. I. Toxicity and Trypanocidal Efficiency.**—*Jl. Amer. Med. Assoc.* 1924. Nov. 29. Vol. 83. No. 22. pp. 1734–1736. [6 refs.]

The authors tested the trypanocidal value of sulpharsphenamin on rats infected with *T. equiperdum* and compared the action with that of arsphenamin and neoarsphenamin.

The conclusions are :—

1. Whether we evaluate the drugs studied in this paper on the basis of the absolute weight of their respective minimum effective dose or on that of their arsenic content, we must conclude that much more sulpharsphenamin (or the corresponding French product, sulpharsenol) is required to sterilize animals infected with *Trypanosoma equiperdum*, than arsphenamin or neoarsphenamin. In the same series of experiments, it required about 18 mg. of sulpharsphenamin per kilogram to produce the results obtained with, approximately, 4 mg. of arsphenamin or 6 mg. of neoarsphenamin.

2. Taking the chemotherapeutic $\frac{\text{Maximum Tolerated Dose}}{\text{Minimum Effective Dose}}$ index as the criterion of therapeutic efficiency, sulpharsphenamin based on trypanocidal tests is considerably inferior to arsphenamin, and at most one-half as efficient as neoarsphenamin.

3. The trypanocidal efficiency of sulpharsphenamin is practically the same, whether administered intramuscularly or intravenously.

W. Y.

UHLENHUTH (Paul), KUHN (Philalethes) & SCHMIDT (Hans). **Ueber ein neues trypanozides Antimonkomplexsalz (Heyden 661).** [On a New Trypanocidal Antimony Complex Salt (Heyden 661).]—*Deut. Med. Woch.* 1924. Sept. 19. Vol. 50. No. 38. pp. 1288–1289. [18 refs.]

The paper commences with a brief summary of the chemical constitution of the various organic compounds of antimony which have been used in the treatment of syphilis and trypanosomiasis. One of these, "Heyden 661," has a marked action in trypanosomiasis of mice. This drug is an almost colourless powder easily soluble in water, producing a neutral solution which bears the addition of ammonia or caustic soda without precipitation. Details are given of a number of experiments showing that 2 mgm. of the drug suffice to cure dourine-infected mice. The trypanosomes disappear from the blood within 2 or 3 hours of the injection.

W. Y.

RAMSIN (S.) & SCHNITZER (R.). **Zur Kenntnis der trypanoziden Wirkung des Antimons.** [The Trypanocidal Action of Antimony.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Nov. Vol. 28. No. 11. pp. 471–479. [11 refs.]

The following are the conclusions :—

1. The trypanocidal action of stibenyl in experiments with mice infected with nagana is definitely less than that of tartar emetic (in the relation of 1 : 15). Its toxicity is also less (in the relation of 1 : 8–1 : 10) and the therapeutic index is somewhat less favourable.

2. In contrast to animals treated with tartar emetic those treated with stibenyl remained without exception relapse free. There is, therefore, in antimony compounds an antimutative action of which tartar emetic as such does not permit of recognition.

3. An arsenic fast strain which showed no resistance to tartar emetic was definitely fast to stibenyl. Resistance to emetic and resistance to antimony cannot therefore be regarded as identical. For the first time differences of avidity, depending on the constitution, analogous to what is known to be the case in the arsenic series, are seen in the antimony series.

W. Y.

VOEGTLIN (Carl), DYER (Helen A.) & MILLER (D. Wright). **On Drug-Resistance of Trypanosomes with Particular Reference to Arsenic.**—*Jl. Pharm. & Experim. Therap.* 1924. Vol. 23. pp. 55–86. With 2 figs. [30 refs.]

Acquired tolerance of poisons is one of those immemorially familiar mysteries into the secrets of which the authors of this most interesting paper seek to penetrate by the experimental route. Among numerous fairly well known facts mentioned in their prolegomena they put some emphasis on the fact that resistance to arsenic can be produced by certain orthochinoid dyes (acridin, oxazin, pyronin) having no obvious chemical relations with arsenicals. Of their numerous experiments one series shows that trypanosomes readily acquire an arsenic resistance if injected into rats that have previously been treated with arsphenamin. This resistance, it is noted, is transmitted to the progeny produced by fission ; it is persistent, and it shows that arsphenamin persists in the host's body for a long time and may be more conducive to the production of arsenic resistant trypanosomes than more easily excreted arsenicals like atoxyl. Another series of experiments shows that an arsenic resistance acquired and retained by trypanosomes in one species of animal host (rat) can be considerably lessened in that particular species of host by intervening passage through a host of another species (rabbit, dog). This phenomenon cannot be explained by a simple chemoceptor theory ; it points to a contributory participation of the host. In short, a real understanding of the nature of arsenic resistance of trypanosomes must be based on knowledge of the "mechanism" of the toxic action of arsenic on living protoplasm. As regards this mechanism it is known that the toxic action of arsenic on trypanosomes depends on the stage of oxidation of arsenic, the arsenoxide (R. As = O) being the highly toxic form. It is also known that the action of arsenoxide on trypanosomes is completely inhibited by the interaction of certain sulphydril compounds (glutathione, cystein). These sulphydril compounds, which are normal constituents of active protoplasm, have been shown to play

an important part in cell respiration, and the cell must therefore be supposed to possess some means of regulating their function. "A working hypothesis of the mechanism of resistance is suggested which is based on the action of arsenic on the dynamic equilibrium of which glutathione is a component, and which regulates the respiration of protoplasm," a conclusion which seems to be not quite original.

A. Alcock.

ROSENTHAL (F.). **Die trypanociden Stoffe des menschlichen Serums, ihre biologische und klinische Bedeutung.** [The Trypanocidal Substances of Human Serum, their Biological and Clinical Significance.]—*Klin. Woch.* 1924. Sept. 9. Vol. 3. No. 37. pp. 1657–1660. [29 refs.]

LAVERAN, in 1902, demonstrated the trypanocidal action of the serum of man and of the higher apes, and the relative resistance of man to infection with trypanosomes as a whole was at first explained by this fact, but later observations were recorded which caused one to doubt the accuracy of this assumption. The serum of such relatively resistant animals as sheep, goats and pigs does not exhibit this trypanocidal action. Further, LAVERAN showed that the trypanocidal action of the primates' serum is in some way connected with coagulation, since human plasma had but slight action as compared with that of the serum. Either there must be present in the plasma limiting bodies which are eliminated in great part by coagulation or the trypanocidal action of human serum is due in great part to an artificial product which is not found in the circulating blood. Furthermore, human serum and that of the higher apes is not itself fatal to the trypanosomes, but only exerts a trypanocidal action when it is introduced into an organism of another species.

The trypanocidal action of the primates' serum has no parallel amongst the known normal antibodies of serum. It is inactive *in vitro* and it is not changed by the addition of leucocytes or organ cells, it is destroyed at 64° C. and not reactivated by the addition of complement; moreover, it is not related to the immune bodies produced in the course of subacute or chronic trypanosomal infections since trypanosome strains which have become serum fast are cured by normal human serum just as are normal strains. The trypanocidal substances in human serum are peculiar in that their presence appears to be bound up in the narrowest manner with the functional capacity of the human liver. EHRLICH (1907) was the first to point this out many years ago in his Harben lectures, wherein is a brief remark that in hepatic diseases there is often a small decrease in the trypanocidal action of the serum. This observation led to numerous investigations which have not only afforded an insight into an unknown partial function of the liver, but also have brought out new knowledge on the vital functions of the reticulo-endothelial cell apparatus, the significance of which in curative processes is coming more and more into prominence as observations accumulate [this *Bulletin*, Vol. 19, pp. 154 and 520, and Vol. 20, p. 337 and p. 700].

The author's investigations have shewn that localized lesions of the liver such as tumours do not cause any diminution of the trypanocidal titre of the serum. It is only in those conditions which involve a complete breakdown of the vital functions of the liver resulting

from the most severe damage to the whole organ, and in all cases of severe icterus with diffuse hepatitis, that the trypanocidal titre is greatly lowered.

Further work has shewn that the fall in the trypanocidal titre of human serum which takes place in these diffuse parenchymatous disorders of the liver is not a "plus phenomenon" resulting from the formation of new bodies which inhibit the trypanocidal activity, but a "minus phenomenon" resulting from the destruction of the processes which produce the trypanocidal substances. The absence of the trypanocidal substances from the serum of new-born children is due to the fact that the liver has not yet reached its complete functional maturity.

Reference is made to the work of LEICHTENTRITT and ZIELASKOWSKI [*loc. cit.*, Vol. 20, p. 337] who showed that in the acute stage of Barlow's disease of children the trypanocidal action of the serum was diminished, but as convalescence set in it increased. Rosenthal is inclined to ascribe the decrease to a relatively slight destruction of liver function in conjunction with the incomplete functional activity of the liver normally found in sucklings and very young children.

Since human serum is without trypanocidal action *in vitro*, its introduction into the infected animal must call forth some biological mechanism whereby the inactive serum is invested with a new sort of curative action against experimental trypanosome infections. It is known that certain drugs behave in a similar manner, and it is recalled that LAVERAN and MESNIL described the trypanocidal action of serum not as that of an immune body, but as that of a drug.

The work of the author and FREUND [this *Bulletin*, Vol. 20, p. 700] showed that injection of active trypanocidal human serum into animals does not result in the production of antibodies against the trypanocidal substance. Repeated injection of large amounts of human serum does, however, inhibit the protective action of the serum when given therapeutically to the subsequently infected animal, but this is not an immunity process, but an exhaustion phenomenon of the treated organism which is no longer able to form the trypanocidal substances out of the injected serum.

It has been shewn that after extirpation of the spleen and simultaneous iron blocking of the reticulo-endothelium, the trypanocidal action of human serum is very greatly decreased or even totally annihilated; either of these processes alone frequently produces a definite effect, but the two together constantly produce a marked decrease. Apparently just as the reticulo-endothelium can take up dyes, colloidal suspensions of metals, erythrocytes, bacteria, bile pigments and cholesterin, so contact with the reticulo-endothelium converts the inactive (trypanocidogenous) bodies of human serum into trypanocidal substances. This process illuminates in a particularly characteristic manner the highly important part played by the tissues in curative processes.

A number of somewhat comparable observations are briefly mentioned. It has been shewn that with the rapid fall of the leucocytes, ethylhydrocuprein (optochin) loses its chemotherapeutic activity in experimental pneumococcal infections, and similarly bacteriotrope sera are robbed of the therapeutic property in animals which have lost their leucocytes as the result of action of thorium X. Animals immunized against hen's blood and subjected to X-rays rapidly die after a further injection of hen's blood, because, owing to

the severe damage of the mesenchymal vessel wall cells, the poisons set free by the intravital haemolysis can no longer be removed from the circulation by a phagocytic reaction. Mice withstand an otherwise fatal trypsin poisoning when the function of the reticulo-endothelial apparatus is damaged through iron blocking.

W. Y.

COLLIER (W. A.). **Ueber einen Versuch, Tsetsetrypanosomen durch Festigung gegen Menschenserum menschenpathogen zu machen.** [An Attempt to make Trypanosomes Pathogenic to Man by making them fast against Human Serum.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Nov. Vol. 28. No. 11. pp. 484–488. [19 refs.]

The observation of LAVERAN and MESNIL that human serum and that of certain other animals exerted a curative action when injected into small animals infected with certain pathogenic trypanosomes gave rise to many investigations. It was thought that this explained the non-pathogenicity of nagana for man and JACOBY succeeded in making trypanosomes accustomed to human serum and considered that it would be possible to infect men with such trypanosomes. LAVERAN and MESNIL followed up the question and obtained a strain of tsetse trypanosomes resistant to baboon serum and then injected the strain into a young baboon, which remained healthy. The baboon, however, differs from man in that it is resistant to all trypanosomes, and it seemed therefore desirable to examine the question in the case of man, the more especially as such an observation might throw light on the important question of the identity of *T. rhodesiense* and *T. brucei*.

A strain of *T. brucei* (known in the Speyer House as "Strain Prowazek") was used. This strain is highly pathogenic for mice and very susceptible to human serum. It was rendered fast to human serum and found then to react well to Germanin (Bayer 205). The author injected himself intramuscularly with mouse's blood containing about 200 million trypanosomes. The result was negative. Three other persons were then injected subcutaneously and one intravenously, and in all the result was likewise negative.

From these experiments it follows that tsetse trypanosomes, although completely immunized against human serum, are unable to infect man. The pathogenicity of trypanosomes has therefore nothing to do with the degree of resistance to the serum of the species of animal concerned. LAVERAN and MESNIL were the first to show that human serum has no trypanocidal action *in vitro*, but only when injected into an infected animal. Reference is made to the work of ROSENTHAL and FREUND which indicated that a trypanocidogenous substance in human serum is converted in the injected animal body into an active substance.

The question of the identity of *T. brucei* and *T. rhodesiense* must still be left in abeyance.

[This interesting paper should be read in conjunction with that of ROSENTHAL summarized above.]

W. Y.

KUDICKE (R.), STRAUSS (Ed.) & COLLIER (W. A.). **Versuche zur Gewinnung von trypanoziden Substanzen durch Hydrolyse von Eiweisskörpern.** [Experiments to obtain Trypanocidal Substances through the Hydrolysis of Albuminous Substances.]—*Ztschr. f. Hyg. u. Infektionskr.* 1924. Sept. 20. Vol. 103. No. 3. pp. 622–639. [27 refs.]

The experiments which are the subject of this paper are based on the view that trypanosomes must be influenced by the products of disintegration of proteids. The article is of a somewhat technical nature and should be consulted in the original by those interested. The following are the conclusions :—

1. In the mixture of albumoses and peptones arising from the mild hydrolysis of albuminous substances, substances are present which are able to kill trypanosomes *in vitro*.
2. Possibly products of advanced albuminous disintegration, of which the character is not known, act in a similar manner.
3. The conjecture is probable that similar substances are also formed in the body of the infected animal and aid it in its warfare against the parasites.

W. Y.

LOW (George C.). The Modern Treatment of Human Trypanosomiasis.—*Jl. State Med.* 1924. Nov. Vol. 32. No. 11. pp. 535–538.

MISCELLANEOUS.

SITSEN (A. E.). **Over kwaadaardige gezwellen op Java.** [Malignant Tumours in Java.]—*Nederl. Tijdschr. v. Geneesk.* 1924. May 31. Vol. 68. 1st Half. No. 22. pp. 2467–2478. With 2 figs. [19 refs.]

A description of material from central and east Java collected at the medical school in Surabaya since 1913, consisting of 145 cases (89 carcinoma, 44 sarcoma, 12 of mixed or other nature), 44 among Europeans, 90 among natives and 11 among Chinamen. The usual types of carcinomata and sarcomata met with in Europe were found; the list is supplemented by the records of other investigators in Java.

Owing to many difficulties, the present knowledge of the incidence of malignant tumours in Java can be based only on hospital returns and results of post-mortem examinations. Hospital returns from Batavia (de LANGEN) show an incidence of malignant tumours of 0·9 per 1,000 (in 48,838 patients); in 1,031 post-mortem examinations performed in Surabaya malignant tumours were found in 13 cases (7 carcinomata and 2 sarcomata); in Deli (Sumatra) BAERMANN found 12 carcinomata and 2 sarcomata in 1,800 obductions; on the other hand, SNYDERS found 20 carcinomata in 736 obductions in Medan (Sumatra), quite near to BAERMANN'S hospital. But SNYDER'S material is an artificial coolie population living under favourable hygienic conditions in which, consequently, other causes of death play a less important part (but this applies to BAERMANN'S material also). The incidence in various organs shows the relative preponderance of primary hepatic carcinomata (3 $^0/_{00}$ in Surabaya, 4·5 $^0/_{00}$ among BAERMANN'S, 13 $^0/_{00}$ among SNYDER'S material; as a comparison: 3 $^0/_{00}$ among the obductions in Amsterdam of persons above 20 years of age (the Javanese material not including younger persons). Carcinomata of the stomach are rare (1 $^0/_{00}$ in Surabaya, 8 $^0/_{00}$ in Amsterdam among persons of the same age); so are intestinal carcinomata (1 $^0/_{00}$). Carcinomata of the mouth and the throat (except of the tongue) are not particularly preponderant among natives (7 in 48 carcinomatous tumours) as compared with Europeans in Java (4 in 33 carcinomatous tumours); carcinomata of the tongue were much more common among Europeans in Java (5 : 1), although the chewing of Sirih is a widespread habit among natives. External carcinomata were much more prevalent among natives (12 : 1).

N. H. Swellengrebel.

MENDELSON (Ralph W.) & ELLIS (Aller G.). **Cancer as a Public Health Problem in Siam.**—*Jl. Trop. Med. & Hyg.* 1924. Oct. 15. Vol. 27. No. 20. pp. 274–278. With 6 figs. [2 refs.]

The authors give the cancer statistics for 1922 and 1923 of the Central Hospital, Bangkok.

Number of Persons coming to Clinic.

Male.	Female.	Total.
24,340	3,922	28,262

Cases of Cancer in Males.

	Oral.	Penile.	Gastro-intestinal.	Extremital.	Cranial.
	21	13	4	3	2
Average age ..	50·0	38·1	48·2	52	49·5

Cases of Cancer in Females.

Oral.	Uterine.	Gastro-intestinal.	Mammary.
4	1	1	4

The total oral cases numbered 47·1 per cent. of all cancer cases, and the male penile cases 30·2 per cent. of the male cancer cases. All the patients with oral cancer were addicted to betel nut chewing, which one of the authors considers to be a potent cause (but see Ellis, this *Bulletin*, Vol. 20, p. 56).

In the Chulalongkorn Hospital, of 102 cases operated on for cancer 52 were of the lip. Of the penile cases they note that circumcision is not practised in Siam, and in a majority of cases a distinct history of preputial irritation can be obtained. [The average age given in the text, 31·1 years, differs from that of the table.]

The incidence of gastro-intestinal cancer is not such as to lend support to the suggestion that the consumption of vegetables contaminated with sewage is a cause, for the use in the East of human excrement as a fertilizer is universal. Superficial cancers are in most cases, if not in all, preceded by luxuriant papillary growth. As evidence of this 8 cases are briefly described, 4 of the lip and 4 of the penis. In the U.S.A. papillary growth precedes cancer of the skin in some cases, but cancer begins usually very soon with rapid infiltration and early ulceration. The glands are implicated early in America, but it is not so in Siam. Unfortunately, the great number of patients come too late for surgical removal. The authors think that the practice of circumcision and the abandonment of the chewing habit would save many lives, but are under no illusions about the difficulty of these reforms.

A. G. B.

Old (J. E. S.). **Cancer in African Natives.** [Correspondence.]—*Brit. Med. Jl.* 1924. Oct. 11. pp. 689–690.

Dr. Old, writing from Nyasaland, reports having removed from a Bantu man there, twenty years ago, a growth that was microscopically determined (in London) to be an epithelioma. He also reports having seen a quickly fatal sarcoma of the skull in a native boy, an epithelioma of the tongue in a native (Yao) woman, and a growth on the forearm, which possibly was not the sarcoma that he supposed it to be, since in a few months it decreased to half its former size by no other treatment than auto-suggestion —which subtle process he thinks may possibly be the constant exciting *cause* of cancer.

A. Alcock.

Huot & Gontier. **Un cas de cancer primitif du foie.**—*Bull. Soc. Path. Exot.* 1924. June 11. Vol. 17. No. 6. pp. 508–511.

The case of a native of about 35 seen at Dakar with great emaciation and a swollen abdomen. Having drawn off 8-9 litres of fluid the authors felt the liver's edge three fingers below the costal edge in the nipple line; the left lobe, or what corresponded to it, was a mass of woody hardness with rounded bosses. The history went back 4 months. There were

signs of syphilis. Death occurred 9 days later. On the lower surface of the liver, which weighed 1882 gms., and on the mesentery, nodules were found of size between a nut and an orange. Histologically there was cirrhosis and decided changes in the liver cells. Primary liver cancer is frequent about Dakar.

A. G. B.

Irvine (A. C.). **Notes on a Case of Melanotic Sarcoma, with an Account of Two Other Malignant Tumours.**—*Kenya Med. Jl.* 1924. Sept. Vol. 1. No. 6. pp. 183–184.

1. A native woman with two tumours situated symmetrically one on each side of her back, one quite black, the other speckled with black; and also with two large pigmented moles, one on each side of her face, also in symmetry. The larger tumour, which was breaking down, was removed, and was pronounced to be a melanotic spindle-cell sarcoma.

2. A native man with a deep-seated painful growth in the parotid region causing swelling externally and symptoms of "pressure in all directions." Before the patient went home to die a piece of the tumour that could be removed was pronounced to be a carcinoma.

3. A woman (race not stated) with a myeloma of the lower jaw. The common carotid was tied. A fortnight later five septic teeth were extracted on that side, and a few days later as the temperature rose high and the tumour swelled it was removed, and was found to be gangrenous at centre. The patient died.

A. A.

Tanon (L.) & Cambessédès. **L'alastrim.**—*Ann. d'Hyg. Publique, Industrielle et Sociale.* 1924. Sept. New. Ser. No. 9. pp. 552–563. With 2 text figs.

A general account of alastrim which the authors, with the majority of writers, hold to be mild smallpox. They observe that before vaccination was introduced there were mild epidemics of smallpox as well as severe ones, a fact which led to the practice of variolization, but in recent times only severe outbreaks conveyed by non-vaccinated persons have been prevalent, with the result that this form is held to be true variola and the reappearance of the mild form to justify the opinion of a new disease.

A. G. B.

Schaefer (H. F.). **Notes sur deux cas d'Alastrim.**—*Rev. d'Hygiène.* 1924. July. Vol. 46. No. 7. pp. 697–699.

A ship put in at a Martinique port October 19–22; an epidemic of alastrim was just over. It then went through the Panama canal, was at Los Angeles, November 6–16, Tacoma, November 20–21, and reached Vancouver, November 22. The first case of alastrim appeared on December 1, and the second on December 15. The author considers Martinique to have been the source of infection of the first case, though the interval was 40 days.

A. G. B.

i. Malone (R. H.). **A Note on a Series of Cases of Pneumonia treated with Pneumococcus Vaccine.**—*Indian Jl. Med. Res.* 1924. July. Vol. 12. No. 1. pp. 105–108.

ii. King (H. H.). **A Statistical Analysis of Captain Malone's Report on the Treatment of Pneumonia by Vaccine.**—*Ibid.* pp. 109–111.

i. The author has observed that immune bodies were produced more readily in rabbits inoculated with pneumococci obtained directly from the peritoneal cavity of artificially infected rabbits than in others immunized by means of cultures grown on blood agar. The method of preparing the vaccine is described.

The cases at Quetta, comprised 58 of pneumonia, treated alternately with and without vaccine. All received intravenously 10 per cent. glucose in normal saline plus 7·5 grains of quinine hydrochloride once a day, the quinine to combat malaria. The first dose was 400 million of a stock vaccine of Types 1 and 4, and on the next and following day the vaccine was of the homologous type, the type being ascertained by passage of sputum through a young rabbit; 3 doses was the tale. The results are shown in the table:—

	Number of cases.	Number of recoveries.	Average days of fever, recoveries only.
A. Cases treated on or before the 3rd day of disease	18	17	4·4
B. Untreated controls corresponding to group A	17	12	8·3
C. Cases treated on or after the 4th day of disease	11	6	8·7
D. Untreated controls corresponding to group C	12	8	8·8
E. Total cases treated...	29	23	5·5
F. Total cases untreated	29	20	8·5

The effect of the vaccine given before the fourth day of disease has been to shorten the course of illness, lower the death rate and increase the number of cases terminating by crisis rather than by lysis. Moreover, the vaccine treated patients "appeared to be less toxic, slept better and did not have the same respiratory distress as their neighbours." If good results are to be secured, treatment should be commenced before the fourth day.

ii. Major King considers that Captain Malone's results were well controlled, and he endorses Malone's conclusions. He suggests that attempts to grow typed strains in artificial special media containing fresh animal extracts or exudates might be successful in producing antigens as efficient as those produced by the intraperitoneal methods described.

A. G. B.

Nicolai (A.). **Bijdrage tot de behandeling der croupeuse pneumonie in de tropen.** [Treatment of Lobar Pneumonia in the Tropics.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 5. pp. 901–904.

Lobar pneumonia is one of the principal causes of death in the tropics. The author ascribes the decrease of the mortality from this disease during the last two years in his practice in a coolie hospital in Sumatra to the treatment he administered.

During 1921, 17 of his 39 cases died (43 per cent.). The treatment consisted of quinine injections (0·5 gm. per day) and symptomatical administration of stimulants and sedatives. During the next 2¼ years, apart from the quinine injections, 3 gm. camphor in oil was given subcutaneously every day as long as the fever lasted. In a series of 38 cases there were no deaths. The author did not see that these cases differed in character from those of the previous series, but leaves the possibility open that the decrease of the hookworm infection in his labourers may have favourably influenced their general powers of resistance.

W. J. Bais.

Sprawson (C. A.). **Scarlatina in Indians.**—*Indian Med. Gaz.* 1924. July. Vol. 59. No. 7. pp. 344–345.

The author recalls that Rogers, in his "Fevers in the Tropics," states that when scarlatina is imported into India it rapidly dies out, and that it rarely, if ever, attacks natives of the country. The author is inclined to question this conclusion. "When," he writes, "an infective disease does not occur in a country, it is probable either that the organism has not been introduced into the country, that its vector is absent, that the adult population has acquired immunity, or that the conditions for the organism are unfavourable." Scarlatina has often been introduced and a small epidemic at Lucknow in 1914 showed that the conditions are not always unfavourable. He thinks that the disease probably does occur among Indians because: (*a*) Acute nephritis is a common disease among young Indians, who often give a history of "fever," and nephritis in the young is commonly due to an "infection"; (*b*) He has seen two Indian children of a family desquamating after a fever and a third with signs of nephritis. There is therefore in the United Provinces an acute febrile disease followed at times by nephritis. He explains why this disease has not been recognized and concludes with the practical suggestion that a number of nephritic Indian children and controls should be tested with the rival claimants for recognition as the cause of scarlatina, viz., the anaerobic diplococcus of di Cristina and the haemolytic streptococcus of Dick, by complement deviation or skin test.

A. G. B.

Yang Ting Kuang & Shih (W. H.). **Scarlet Fever in China.**—*Nat. Med. Jl. China.* 1924. June. Vol. 10. No. 3. pp. 153–170; and *North Manchurian Plague Prevention Service. Reports 1923–1924.* Vol. 4. pp. 207–233.

As scarlet fever is a disease of temperate climates and China, Manchuria included, lies between 20° and 54° N., great variations may be expected in its incidence. A questionnaire was therefore sent to doctors in various parts of the country, and here we have the replies collated, and supplemented by available medical publications. In Lennox's statistics of the health of foreign missionary families in China there were 193 cases of scarlatina among the children, 104 in North China (12·5 per cent. deaths), 85 in Central China (2·3 per cent. deaths), and 4 in South China (no deaths). There follow details for Hong Kong and ten Provinces. In Hong Kong during 12 years (1911–22) out of 15,493 cases of infectious disease only 41 were scarlet fever, and

10 of these were in Europeans. An interesting extract is given from Dr. Arthur STANLEY's report for 1917 on Shanghai. The disease was first recorded there in 1873, and in 1902 there were said to be 1,500 Chinese deaths. It is of virulent type among both Chinese and Europeans. It is at its maximum in spring and at its minimum in autumn, a seasonal prevalence which is probably due to the hot summer. Of 638 cases seen at the Peking Government Infectious Diseases Hospital in 1915–23, 20·8 per cent. died. The disease is much feared by the well-to-do. Among the authors' conclusions are the following :—

"1. Scarlatina is practically absent or very mild in South China, not unduly severe in Shanghai and central provinces, and severe in the north.

"2. The disease seems to be comparatively more frequent among Westerners residing in the country. In the north, although several deaths have been recorded among them, infection is usually not so severe as among the same classes of Chinese. The statistics on missionary families, compiled by Dr. Lennox and briefly referred to elsewhere in this article, form instructive reading.

"3. The special virulence of the disease manifested when Chinese are attacked in epidemic form may be explained partly by its recent introduction into the country before any natural immunity is yet evolved. But the example of Japan, which, owing to her complete hospitals, and thorough system of notification and isolation, has only allowed a mild and infrequent form to appear among the people, is sufficient to teach the responsible authorities in China the best and quickest way of subduing the disease."

A. G. B.

BASU (Uma Prasanna). **Fifteen Cases of Exanthematic Typhus in Calcutta.**—*Indian Med. Gaz.* 1924. Aug. Vol. 59. No. 8. pp. 396–401. With 4 charts and 2 figs. [6 refs.]

Between November, 1922, and January, 1923, the author saw 15 cases of fever in Calcutta diagnosed as typhus owing to : (1) the early appearance of nervous symptoms—headache, delirium, vomiting and prostration ; (2) the appearance on the 4th or 5th day of a macular exanthem which became petechial ; (3) its persistence ; (4) the continuation of fever to the 12th or 14th day. Twelve cases were in children aged 11 months to 12 years, 3 in adults. None died. In 3 cases lice were discovered on the hair of the scalp and the eyelashes. Six cases occurred in one house, and owing to the coldness of the season the children's underclothes were never taken off, so that the conditions were favourable to body lice, though it seems that none were found. Measles was ruled out by the absence of oculo-nasal catarrh, of the horse-shoe shaped rash in the circumoral region, and of Koplik's spots. The Weil-Felix test was carried out 3 times, by Major ACTON and his assistant, in 2 cases 2–3 weeks after the fall of temperature, when the reaction was positive, 1 in 30, and in the other on the 5th day when there was no agglutination. The author notes that an endemic area of typhus has been recorded in the north-east of the Punjab and the Himalayan hill tracts. Three temperature charts are given and a photograph showing the petechial rash one month after convalescence. [Curiously, the author does not refer to PHIPSON's paper (this *Bulletin*, Vol. 21, p. 472) on typhus in Simla. Here the rash was by no means obvious and might have been overlooked, but the Weil-Felix reaction was positive in 10 cases. 1 : 32 was considered to be positive and 1 : 100 was exceeded in 7 cases.]

A. G. B.

CUNNINGHAM (J.) & THEODORE (J. H.). **Typhus Fever in the Agency Tracts, Madras Presidency.**—*Indian Med. Gaz.* 1924. Oct. Vol. 59. No. 10. p. 506. With 1 fig.

The distribution of typhus fever in India being so imperfectly known, this paper is intended to record the occurrence of nine cases of the disease in the Agency Tracts of the Madras Presidency in Feb.-March, 1924, the Weil-Felix reaction being confirmatory in the case of one serum sent to the King Institute for examination. The cases occurred among the Assam Rifles, who had arrived in the Agency at the end of January. So far no case has been reported among the civilian population of the Tracts, where the disease was previously unknown.

A. A.

STUART (George). **Observations on the Incidence of Typhus Fever in Palestine with Special Reference to Type and Diagnosis.**—*Jl. Roy. Army Med. Corps.* 1924. Oct. Vol. 43. No. 4. pp. 271–281. With 1 map in text. [12 refs.]

The point of this paper lies mainly in the last words of the title. During the 3¼ years, January, 1921, to March, 1924, there were recorded in Palestine, mainly among Jews in Jaffa, 137 cases of typhus fever of a lenity so remarkably constant that 112 of them could be described as "mild clinical typhus" without delirium or loss of consciousness, and 18 more being unaccompanied by any rash could be set down as "atypical."

Whether these cases are evidence of a smouldering residue from the epidemic that raged in Palestine between 1915 and 1917, or whether the infection was introduced *de novo* with the flood of Jews (31,551 since September, 1920) that came into Palestine (mainly through Jaffa) from the lately typhus-stricken regions of Middle Europe, is left an open question. What the author emphasizes is the extraordinary consistency with which the Weil-Felix reaction was justified as a means of diagnosis.. Of 102 of the clinically positive cases put to this test—many of them by FELIX himself—only 1 was negative; moreover, the reaction was positive in all of the 18 atypical cases. Initial failures of the reaction can be overcome by repeating at intervals between the 3rd and 12th days of the disease.

A. A.

FORSYTH (W. L.). **Infantile Billiary Cirrhosis of the Liver in India—a Review.**—*Trans. S. Indian Branch Brit. Med. Assoc.* Madras. 1924. Vol. 17. No. 2. pp. 85–99.

This effective paper does not make any essentially important addition to the recorded facts, but gives a novel (biochemical) version of their interpretation.

The historical review reminds us that infantile billiary cirrhosis is an insidious, painless, fatal enlargement of the liver, not connected with any specific dyscrasia like syphilis, malaria, etc., occurring in quite young children chiefly of the Hindu community, in all parts of India. The disease was first noticed in Calcutta, originally by SEN, and thereafter by GIBBONS, who gave it its name, described it as essentially a primary fibrosis of the hepatic tissue accompanied by proliferation of the bile-ducts, and believed it to be caused by chemical irritants derived from ill-digested food.

The author has studied the disease in the Madras Presidency, where, in certain districts, its incidence is particular to children of the Brahmin caste—a well-to-do class whose diet, strictly vegetarian, is vitiated by an intolerable deal of chilli, pepper and other curry-spices and hot condiments. He therefore inclines to the irritant theory of causation and thinks that the irritant may reach the infant in the mother's milk, or possibly also, to begin with, during intra-uterine existence. He has done various feeding experiments with rabbits, and finds that an atrophic cirrhosis of the liver followed the feeding of a rabbit on a normal diet with addition of curry-stuff; and he refers also to FINLAY'S experiments in the production of biliary cirrhosis in rabbits by subcutaneous injection of manganous chloride. His investigations of the milk of nursing women are still in progress. So far he has but an impression that the milk of the Brahmin mother is richer in fat than that of other castes. (However, the liver of a rabbit fed on a normal diet *plus* excess of fat showed nothing of interest.) Various other theories of causation are considered; those that, in the author's opinion, may have some contributory significance are vitamin deficiency and errors of diet (as distinct from a specifically vitiated diet); both of these might reasonably be supposed to operate through the milk, the character of which is well known to be influenced by the maternal food and environment.

Both from the historical and the descriptive standpoints the paper is very useful, quite apart from the theory of causation, which is of the nature of a preliminary communication.

A. A.

GOMES (J. M.) & DE ASSUMPÇÃO (Lucas). **Em torno do genero coccidioides.**—*Ann. Paulist. Med. e Cirurg.* 1924. Vol. 15. No. 3. 13 pp. With 8 figs. [18 refs.]

Coccidioides immitis is responsible for a disease which is often erroneously described under the name of Blastomycosis. If the skin only is affected the condition yields to treatment, but if the mucous membrane and lymphatics are involved the disease is very serious and often fatal. *C. immitis* has been held to be the only species known, but the author furnishes evidence to controvert this. He describes two types which differed in several particulars. Type A. was obtained by puncture of an abscess of the neck in a patient with severe generalized infection. The disease terminated fatally after a course of a few months. Type B. was from a patient who had suffered for three years and showed lesions of the face, neck and chest. Cultivation on Sabouraud's glucose medium did not give a growth for over 2 months. The patient's local condition improved greatly with administration of iodide of potassium and the glands cicatrized, but death occurred later from acute tuberculosis.

H. Harold Scott.

POLECK. **Ueber die eigentlichen Ursachen und ueber das Wesen der sogenannten Tropenneurasthenie.** [The Essential Causes and Nature of So-called Tropical Neurasthenia.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. May. Vol. 28. No. 5. pp. 193–205. [7 refs.]

The author's experience was gained in South-West Africa, where he took part in the Hottentot War, 1904–7. He does not admit that

tropical neurasthenia should be regarded as a special disease condition. Climate has nothing to do with it. Tropical neurasthenia can be spoken of only in the sense in which we speak of war neurasthenia and the like.

A. G. B.

Birt (Ed.). **Zur Behandlung der Elephantiasis Arabum des Unterschenkels.** [Treatment of Elephantiasis of the Leg.]—*Deut. Ztschr. f. Chirurg.* 1924. Mar. Vol. 184. No. 1–2. pp. 110–114.

An account of two Chinese cooks on whom the author operated at Shanghai for elephantiasis of the leg. No mention is made of filaria. The author seems to attribute the disease to a pathogenic agent living in the Yangtse water in which the patients were accustomed to wade. The operation was a modification of Sampson Handley's in which a long strip of thickened skin was excised and silk threads were laid in and removed after 3–4 weeks.

A. G. B.

Burnet (Et.) & Conseil (E.). **Quelques expériences sur la neurovaccine.**—*Arch. Inst. Pasteur de Tunis.* 1924. June. Vol. 13. No. 2. pp. 165–181. [4 refs.]

Levaditi and Nicolau (see this *Bulletin*, Vol. 19, p. 618, under Mutermilch) in their experimental studies of the ectodermoses, or ultra-microscopic infections of tissues derived from the epiblast, have considered the natural affinites of neurovaccine, and again (*Bulletin*, Vol. 20, p. 7, p. 680, and p. 847) have discussed its preparation, selective affinities, and possible practical applications. Jancou also (Vol. 20, p. 847) has recorded the results of its practical use for vaccination. The present authors describe further experiments with neurovaccine, from which they conclude that although by its purity it is an ideal material for the experimental study of vaccinia, yet for human vaccination it has no decided advantages and may sometimes provoke a too intense reaction.

A. A.

Luis Nicolini (Héctor José). **Sobre anquilostomiasis y lepra.**—*An. del Depart. Nac. Hig.* Buenos Aires. 1923. Mar.-Dec. Vol. 29. No. 2. pp. 102-105.

In Corrientes the percentage of infection with hookworm in the rural districts is about 70; in the northern districts, such as Bella Vista, San Luis, Empredado and others, it is higher still.

There are 253 lepers in the same Province, one per mille; in 1906 the incidence was 0·76 and in 1916 it was 0·97 per mille. Measures recommended for dealing with leprosy are on the usual lines of compulsory notification and segregation in leper-colonies, each Province providing its own at the expense of the Government. The author is opposed to isolation or segregation on an island because the measure appears to partake too greatly of the nature of imprisonment.

H. Harold Scott.

MUKERJI (Girindra Nath). **Symptoms and Treatment of Lathyrism.**— *Indian Med. Rec.* 1924. Sept. Vol. 44. No. 9. pp. 265–271. [some 90 refs.]

The author gives a full account of the symptoms, diagnosis and prognosis of lathyrism with remarks on its pathology and treatment and lathyrism in animals. He discusses the prophylaxis, summed up in the restriction of the use of the grain, and has collected a long list of books and papers bearing on the subject.

A. G. B.

REDAELLI (Piero). **Experimental Moniliasis.**— *Jl. Trop. Med. & Hyg.* 1924. Aug. 1. Vol. 27. No. 15. pp. 211–213. [6 refs.]

The author has inoculated by various routes rabbits, guineapigs, rats and dogs with five species of Monilia described by CASTELLANI, one of which was isolated by the author at Pavia. He describes the reactions produced. Two species were lethal to all the animals except the dogs, and one was not pathogenic to any experimental animal.

A. G. B.

BURKITT (R. W.). **Monilia Infection of the Larynx and Trachea.**— *Kenya Med. Jl.* 1924. Aug. Vol. 1. No. 5. pp. 145–146.

The author has seen at least five cases of Monilia infection of the larynx and trachea causing acute obstruction and necessitating tracheotomy. Four were in children and one in an adult; four were Europeans. All had very high fever and nothing abnormal was visible in the pharnyx. After relief from the obstruction, which comes on very quickly, they soon recover; the poison does not seem to affect the heart. In one case he got a complete cast of the trachea and division into bronchi; in the others the membrane came away in bits. Monilia was clearly demonstrated in the cast specimen. Other doctors in Kenya have had similar cases and the author recommends the carrying of a tracheotomy tube and suitable knife. Two cases of this kind are referred to in the Report of the Bacteriological Laboratory for 1921, under the heading pseudo-diphtheria.

[In the November number of the same journal is an account of one certain and several probable cases of diphtheria in Nairobi causing laryngeal obstruction, so that it would appear that caution is necessary in diagnosing moniliasis.]

A. G. B.

MAXWELL (James L.). **Chronic Intussusception.** [Correspondence.]— *Brit Med. Jl.* 1924. Aug. 16. p. 299.

The writer says that in Formosa, where he worked for about 20 years, chronic intussusception formed one of the commonest of serious intra-abdominal surgical conditions; he himself has operated on close on 40. The most characteristic symptom was paroxysmal pain, with complete or almost complete remissions between the attacks. His practice was to reduce the intussusception as far as possible, without the use of unreasonable force, and then to do an ileo-colic anastomosis around the remaining intussuscepted portion. Several such cases were observed for years and remained well. In most instances there appeared to be a tuberculous mass in the caecum and several cases had diffuse miliary tubercles over the surrounding intestines.

A. G. B.

Bensted (H. J.). **Three Cases of Multiple Abscesses of the Liver.**—*Jl. Roy. Army Med. Corps.* 1924. Sept. Vol. 43. No. 3. pp. 208–210. With 1 text fig.

According to Rogers hepatic abscess due to *B. coli* has been rarely described. The three cases here recorded appear to have occurred in India. In each case, 8, 8 and 12 hours after death, pure cultures of *B. coli* were obtained from the pus.

A. G. B.

Roskott (E. R. A. Luyke). **Stollingstijd en aantal bloedplaatjes bij Mijnworm- en Malaria-anaemieën.** [Coagulation Time and Number of Blood Platelets in Hookworm and Malarial Anaemia.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 4. pp. 581–587. [7 refs.]

In five normal individuals in the tropics the coagulation time (Duke's method) varied from 8–19 minutes, the number of platelets from 180,000–460,000 (average 250,000). No marked relation was found between the coagulation time and the number of blood platelets; neither was such a relation detected in anaemia cases. The coagulation time in these cases was not markedly increased. Thrombocytopenia (under 200,000) existed as a rule in malarial patients with enlargement of the spleen. The number was normal in hookworm anaemia.

W. J. Bais.

Grootings (J. W.). **Over Amyloidosis bij Javanen.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 4. pp. 592–599. With 3 coloured plates. [12 refs.]

Grootings gives an anatomo-pathological description of two cases of this affection which is rare in Javanese (this *Bulletin*, Vol. 20, p. 673). In his cases, one apparently caused by chronic malaria, the other by chronic Bright's disease, the distribution of the degeneration over the various organs did not differ from the usual findings in Europe.

W. J. Bais.

Mann (W. L.). **Further Remarks upon an Edema Disease in Haiti, with Special Reference to Etiology and Epidemiology.**—*Milit. Surgeon.* 1924. Sept. Vol. 55. No. 3. pp. 297–328. With 16 figs. [9 refs.]

An account of oedema disease in Haiti was published by the author and two colleagues in 1920 (see this *Bulletin*, Vol. 17, p. 249). The conclusion then reached was that the diet was not at fault. The continued investigations and later conclusions are contained in the present paper, which should be in the hands of all medical officers in the tropics who have to deal with beriberi-like conditions in institutions. The upshot is that the etiology is by no means simple. Diet plays an important part—the ration, its cooking and its serving, but other causes operate such as lack of exercise, and deprivation of sunlight, and possibly others not yet recognized. The problem was that prisoners in certain jails in Haiti were dying, at ten times the normal rate, of a disease of which oedema was the general manifestation, but symptoms might be pulmonary or intestinal, or the oedema

replaced by emaciation, so that diagnosis was doubtful, and for some time it was uncertain whether the disease was one or not. Other prisons were quite free. In the first 12 months the money value of the prison ration was increased 50 per cent. and the sanitary conditions improved, but the fatalities continued.

Epidemiology.—The women prisoners were almost exempt. Of 142 consecutive deaths in the Civil Prison, Cape Haiti, only two were of women prisoners, and those from other causes, but women seem to have been few, about one to fifteen in the prisons taken together. The incidence was epidemic, the disease would appear suddenly, many deaths occurring and would often disappear as quickly. Prisoners confined longer than one year were practically exempt; 62 per cent. of the deaths occurred in persons who had been incarcerated not more than three months. The table shows the tendency to attack certain classes of prisoners.

Class of Prisoners (Penitencier Nacionale).	*Incidence per cent.*
Women prisoners (except women insane)	0
Women insane prisoners	30
Men prisoners (confined over 1 year)	1
Men prisoners (confined less than half a year) ...	80

The following extract shows the difficulties of the investigators :—

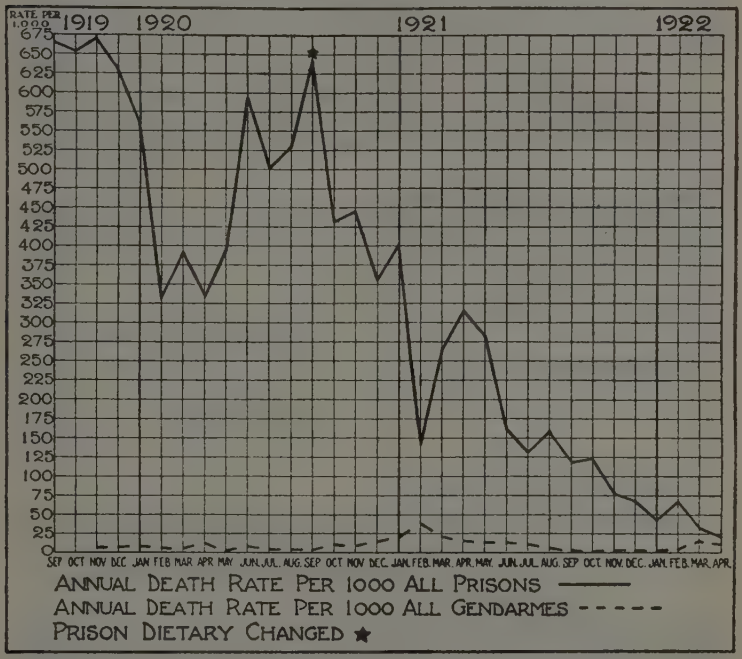
"In one prison, for a period of six months there was a *monthly* mortality rate of 5 to 10 per cent. from this disease, whereas in another institution in the same place and under supervision of the same medical officer, no cases of this disease developed during this period. The money value of the ration of the two institutions was the same, and the dietary was apparently so similar as to be considered practically identical by a casual observer."

Of 44 bandits captured and confined in cells for eight weeks awaiting trial, 4 died within 4 weeks, 25 per cent. had symptoms in 7 weeks and a year later 35 had died in prison. But no evidence of the disease was found in nearly a thousand bandits captured two weeks after the others, so that prison conditions must have been primarily responsible. Another illuminating observation is that amongst the gendarmerie, who about equalled the prisoners in number, were quartered in some instances in the prisons and given an almost identical ration, no case was noted in six years, though in 12 months 1,000 prisoners died. But "there were ten cases in ex-gendarmes who had later assumed the status of prisoners."

Etiology.—Infection was at first suspected and attempts were made to transmit the disease by bedbugs, but the supposition was abandoned. In September, 1920, instructions were issued that the quantity of green leafy vegetables in the diet should be increased and the loss of the germ and pericarp avoided by discontinuance of the practice of sifting or fanning the corn-meal. From this time the mortality and morbidity "presented a gradual, progressive and sustained decrease," as is shown in the attached chart. The author, however, does not consider faulty diet to be the sole or controlling cause. Other factors are necessary to explain the incidence on different prisons and among groups of inmates of a single prison.

Such possible factors are : (1) "inequality of distribution of vitamins to the individual rations." The corn-meal was boiled with lard in a twelve-gallon container; after boiling "for several hours" it became almost solid. It is suggested that the germ and pericarp, as well as the

fat soluble A extracted by the lard, tend to collect at the upper layer and there remain. The female prisoners who were free had their food issued first ; the insane females were not fed with the others. After the women had been supplied, food was served to the long-timers and tradesmen, who very seldom developed oedema, and last of all to the short-timers and recent arrivals, among whom the disease was most prevalent. Later, the order of serving at Cape Haiti was varied, and it is stated that then the disease appeared among the women. Experiments with rats gave some support to this hypothesis.



Annual death rates, per thousand, by months, for all prisons of Haiti, with corresponding rates for the gendarmerie, inserted for comparison.

Chart illustrates the progressive decrease in prison death rate following specific changes in prison dietary, *i.e.*, an increased supply of vitamin-containing food. The slight increase in early part of 1921 was caused by deaths from smallpox.

[Reproduced from the *Military Surgeon.*]

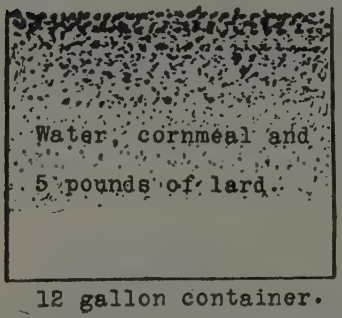
(2) Deprivation of sunlight. The oedema disease in Haiti is confined primarily to institutions, many of which have not free access to sunlight. Here it is significant that prisoners in Haiti awaiting the quarterly assizes cannot be required to perform any labour and hence their access to sunlight is restricted. Four long-term prisoners were given solitary confinement ; three developed severe symptoms of oedema and two died. Here again the partial absence of sunlight may have been the factor which produced the disease. Here is an interesting extract :—

" In one of the smaller prisons where the disease was most prevalent and the death rate extremely high, the prisoners were removed from the

main prison which was undergoing repairs, and kept for three weeks in a temporary building without a roof. Shortly after this, oedema rapidly disappeared from the inmates, and no deaths occurred for six months.

"During the prisoners' sojourn in the temporary building, we had completely disinfected and disinfested the main prison, and the beneficial results were originally attributed to the success of our efforts in ridding the place of an infective agent, but it is not improbable that sunlight was the responsible agent in temporarily stamping out this disease. Changes in diet were made shortly afterwards."

(3) Lack of exercise. BLACKLOCK has recently affirmed this as an explanation of beriberi in prison tailors at Freetown [see page 100]. The authors found that prisoners employed at minor tasks showed less tendency to develop oedema than those who were not required to work. Patients with oedema improved more rapidly if given minor tasks than others whether put to bed or left merely unemployed. The effects, however, of severe muscular exercise, as marching, were disastrous. It is admitted that (2) and (3) are not easily disentangled.



←—Vitamin layer.—Served to women prisoners (except insane women); oedema distinctly absent.

←—Intermediate layer. — Served to tradesmen and long-timers; oedema rare.

←—Avitamin layer.—Served to short-timers; oedema very prevalent.

Schematic Representation of the Method of Cooking and Serving Cornmeal in the Penitentiary in Haiti.

There is a possibility of a concentration of vitamins in upper layer of the cooking mass, thereby causing an unequal distribution of vitamins in the individual ration when issued to the prisoners.

It is suggested that fat-soluble vitamin "A" (due to extraction by means of the lard) and water-soluble vitamin "B" (due to lighter specific gravity of the germ and pericarp which is the vitamin-containing portion of the grain and due to evaporation of water) tend to collect at the top of the container, thus leaving a vitamin residue in the uppermost layer.

Also due to the eventual viscosity of the cornmeal mixture, the lower portion of the mixture is apt to attain a higher degree of temperature—as it is closer to the heat—and thus this will have a greater tendency to destroy the vitamins present in the lower portion.

[Reproduced from the *Military Surgeon*.]

Symptoms.—Hypertrophic, atrophic, mixed and acute pernicious forms are described. The cardinal symptoms are oedema, extreme emaciation, slow pulse rate, subnormal temperature and muscular atrophy. "The absence of partial paralysis, tachycardia and cardiac hypertrophy should serve to differentiate the condition from the disease entity described as beriberi," but the relation of these diseases depends on the definition of beriberi. An instructive table of the symptoms of beriberi and oedema disease is given, and it is suggested that the substitution of corn-meal for rice may account for the differences.

A. G. B.

Sarkar (Sarasi Lal) & Banerji (Santosh Kumar). **Epidemic Dropsy at Atrasia Village.**—*Calcutta Med. Jl.* 1924. May. Vol. 18. No. 11. pp. 731–737. [6 refs.]

An account of a small outbreak affecting the inmates of three houses.

A. G. B.

Mackie (A. S.). **Myositis Purulenta Tropica.**—*Kenya Med. Jl.* 1924. Aug. Vol. 1. No. 5. p. 137.

Case of a Somali in whom four deep-seated abscesses were opened in back, buttocks and thigh, giving vent to much pus. The disease is said to be common, to run a prolonged course, and to be accompanied by much debility.

A. G. B.

Gulland (G. Lovell). **A Note on Psittacosis. With Reports of Two Related Cases.**—*Brit. Med. Jl.* 1924. Aug. 23. pp. 308–309. [3 refs.]

The infection in birds is generally supposed to be contracted from the excreta, which frequently may contain the specific organism, *B. psittacosis*. Two sisters who alone attended a newly arrived Africa parrot were affected. The parrot had diarrhoea and died the day before the onset of the first case, in which the symptoms were those of an atypical pneumonia, as is sometimes seen in paratyphoid fever. This patient died on the fifteenth day, and the second made a slow convalescence. No diagnostic bacteriological or serological observations are reported, but in the second case the pleural fluid was sterile. Such cases may be more common than is generally believed and recognition is difficult.

P. W. Bassett-Smith.

Néel. **Côte française des Somalis. Considérations générales concernant la morbidité et la mortalité au cours de l'année 1923.**—*Ann. de Méd. et de Pharm. Colon.* 1924. Jan. Feb. Mar. Apr. Vol. 22. No. 1. pp. 81–89. [1 ref.]

Nothing has been published of late years about the diseases met with in French Somaliland. According to the author, the heat is not excessive, the maximum only rarely exceeding 42° (107·5° F. !), but the air is always saturated, and, to increase the discomfort, in the summer months there is no breeze, and hardly any fall of temperature at night.

Europeans.—These number 400 to 500, many of whom are old residents. Amoebic dysentery is almost the only tropical disease met with, and this in a mild form. Malaria occurs rarely at Djibouti, and blackwater fever has not been seen. Asthenia and anaemia are common in summer, respiratory affections unexpectedly so in winter. Heat stroke, which one would expect to be a menace, is not so, except in stokers and persons similarly employed. One case at least of typhoid was contracted locally. Lichen tropicus and furunculosis are widespread. The boils are treated, always with success, with sulphate of copper in 0·5 per cent. solution, 5 to 10 cc. injected daily into a vein for 8, 10 or 15 days ; the injection, which must be given slowly, is painless. Venereal affections are rare. Children stand the climate badly unless the mother can take them to Abyssinia in the hot weather.

Diré-Daoua, on the Addis-Abbaba railway, has a good climate, but is plagued with malaria ; Harrar, to the south, at 1,800 metres altitude, is a very suitable sanatorium, but access is difficult.

Natives.—Djibouti is the only town with a medical service. The natives, who are either Somalis or Dankalis, in their reaction to disease resemble whites rather than negroes. Smallpox has disappeared, probably owing to thorough vaccination. Typhus has never been recognized, but occurs at Harrar. Tuberculosis is widespread and attacks equally the lungs, bones and glands. The pulmonary form develops as in Europeans but somewhat more rapidly, probably owing to the climate and the underfeeding, for most of the natives subsist chiefly on the milk of badly nourished goats ; syphilis is a frequent concomitant. The local natives are shepherds, sleeping in tents and spending the whole day in the sun, but this does not save them. Hygiene is lacking ; they eat from a common plate, pass the pipe from mouth to mouth, and custom decrees that they receive in their hands the sputa of the sick relative or friend.

Syphilis and gonorrhoea are common and cases of lymphogranulomatosis [? climatic bubo] are seen. Trachoma is widely spread. There is no leprosy and no beriberi except in the prisons. In October a form of dengue known as *abourakab* rages ; there are no phlebotomi. Two cases of sprue have been seen, one in a Frenchman who before his arrival at Djibouti had never quitted France. Bilharziasis and yaws are absent. Tropical ulcer is the disease seen most frequently at the dispensary. Mycetoma with both black and yellow grains is not rare. A case is briefly recorded of a supposed lipoma removed from the dorsum of the foot, which on section was found to be stuffed with the black grains of mycetoma ; two years later there was no relapse.

A. G. B.

Acton (H. W.). **Some Recent Advances in the Diagnosis and Treatment of the Commoner Tropical Diseases.**—*Proc. Assam Branch Brit. Med. Assoc. Ann. Meeting, Jorhaut, 16th & 17th February, 1924.* pp. 37–42.

Most of the points of this interesting paper have been already noticed in their appropriate places. Some will bear repetition. All the advances described have been made at the Calcutta School of Tropical Medicine.

Ancylostomiasis.—The relative value of chenopodium and carbon tetrachloride is considered ; for coolies chenopodium is advised if it is important to keep the men at work, CCl_4 if the loss of two days is immaterial. It has been shown that the female hookworm lays more eggs in the three months July-September, and that in these months, which are also those of maximum infection, many young larvae are in the tissues on their way to the gut. Mass treatment is therefore valueless during and immediately after the rains, and only urgent cases should be treated at that period.

Kala azar.—The author considers the results obtained with Von Heyden's 471 to be vastly superior to those of antimony tartrate [Vol. 21, p. 255].

Leprosy.—In India the initial lesions occur usually on the surface of the body, owing to abrasions ; in Europe the nose is the more common site, owing to the protection of clothing and the fact that people do not lie on the ground. When the bacilli are confined to the skin the

disease is non-infectious, and the subjects need not be isolated. Diagnosis depends on : (1) superficial anaesthesia, tested by touching the surface lightly with a piece of rolled paper ; (2) implication (thickening) of nerves supplying the area ; (3) the finding of lepra bacilli in nodules in the ear and face. Fifteen per cent. of out-patients attending the skin department are suffering from leprosy. By treatment 90 per cent. can be rid of all signs of the disease.

Amoebic dysentery.—Deeks' treatment is adopted because the bismuth alters the reaction of the stool in the direction of alkalinity.

Malaria.—Quinidine is the most powerful of the cinchona alkaloids, but owing to numerous objections to it cinchona febrifuge is used at the School of Tropical Medicine ; it is cheap, does not produce nausea, and when given two hours after a meal " the alkaloids arrive in the intestine at the height of alkalinity."

" If this method was generally adopted there would be an enormous advantage, both in the manufacture, as these total alkaloids can be extracted easily, and in the planting of cinchona, as the trees could then be cultivated in places over 3,000 feet high, whereas *Ledgeriana*, the cinchona that gives the best quinine yield, will only grow in volcanic regions with a supply of rain such as occurs in Java and at Mungpoo. The use of cinchona febrifuge would therefore be an advantage, as this would simplify the manufacture and bring a larger area under cultivation so that India could supply the necessary amount of cinchona alkaloids for her needs."

The author finds that when quinine is in an alkaline substrate three times the amount is absorbed ; the febrifuge is therefore given with citric acid, converted in the bowel to carbonate [*l.c.* p. 602].

A. G. B.

CHUN (J. W. H.). **Remarks on the Incidence of Certain Diseases in Chinese and Europeans.**—*Nat. Med. Jl. China.* 1924. June. Vol. 10. No. 3. pp. 145–152. [5 refs.]; and *North Manchurian Plague Prevention Service. Reports 1923–1924.* Vol. 4. pp. 199–204.

Fistula in ano is common in China ; 16 per cent. of 455 operations done by LIBBEY in Wuhu were for this condition. *Tuberculosis* is widespread. Of 1,705 cases seen in 10 months at Harbin, 748 were of glands, 312 of skin, 257 of bones, and 196 of lungs. As the Chinese do not drink milk, the source must be human. *Malignant scarlet fever* was introduced in 1873, and is now of a virulent type. Many Chinese children die of it in the treaty ports. Attacks in foreigners are severe whereas the mortality in Europe is about 3 per cent. *Syphilitic rheumatism*.—Of 689 cases of syphilis seen 71 per cent. were secondary. Many of these complained of rheumatism. No case of tabes or G.P.I. was seen in 4 years.

Appendicitis.—Two cases were admitted in 4 years. In the Harvard Medical School Reports there were

20 European cases in 240 admissions=8·3 per cent.
10 Chinese ,, ,, 766 ,, =1·3 ,, ,,

Carcinoma is not so rare in China as is believed, but " it can be assumed that it is rare when compared to European figures."

Chloroform is taken better by the Chinese than the European ; at Canton ten thousand patients were anaesthetized without a death.

Two tables give data from eight sources showing the relative frequency of a number of diseases among the Chinese.

A. G. B.

Bobbert (A. C.) & van Dam (S.). **Graphische Voorstellingen van de voornaamste ziekten betreffende het Nederlandsch-Indische Leger gedurende de jaren 1908 tot en met 1923, bewerkt naar gegevens van het Hoofdkantoor van den Militair Geneeskundigen Dienst.** [Graphic Representation of the Most Important Diseases in the Dutch East Indian Army from 1908–1923, composed from Data supplied by the Head Office of the Military Medical Service.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1924. Vol. 64. No. 4. pp. 728–729. With 18 charts.

Eighteen graphs concerning enteric, malaria, influenza, cholera, dysentery, bacillary dysentery, amoebic dysentery, beriberi, tuberculosis, primary syphilis, later stages of syphilis, soft chancre, gonorrhoea and its complications, trachoma, pneumonia, abscess of the liver, yaws and sprue, preceded by a few introductory remarks.

W. J. Bais.

Sison (A. G.) & Sison (A. B. M.). [In English & Spanish.] **Study of Anatomico-Clinical Diagnoses based on 2,282 Autopsy and Clinical Records of Medical Cases. Estudio de diagnosticos anatomico-clinicos basados en 2282 autopsias y hojas clinicas en la clinica medica.**—*Jl. Philippine Islands Med. Assoc.* 1924. July. Vol. 4. No. 7. In English pp. 251–256. [3 refs.] In Spanish pp. 276–278.

From ten years' (1911–1922) records of more than ten thousand autopsies furnished by the pathology departments of the Medical College of the Philippines University and of the Philippines General Hospital the authors have selected only the medical cases, which number 2,282. The clinical diagnoses made from these cases were 2,412 in number, and the "anatomical" diagnoses 3,046. It would appear that the clinical diagnosis was found to correspond with the anatomical diagnosis in 58 per cent. of cases. Excluding an unspecified number of pathological conditions not defined in accordance with the official nomenclature, the numerical list of diseases is as follows :—

Typhoid fever	213	Amoebic dysentery ...	63
Broncho-pneumonia ...	412	Acute nephritis	267
Lobar pneumonia ...	178	Chronic interstitial nephritis	211
Acute miliary tuberculosis	101	Chronic parenchymatous nephritis	134
Pulmonary tuberculosis ...	238	Adult beriberi	36
Epidemic encephalitis ...	4	Infantile beriberi ...	34
Cerebrospinal meningitis	96	Malaria	57
Tuberculous meningitis ...	72	Chronic myocarditis ...	34
Chronic endocarditis ...	165	Cerebral haemorrhage ...	97
Acute endocarditis ...	30	Portal cirrhosis	76
Arteriosclerosis	127		
Ileocolitis	228		
Bacillary dysentery ...	74		

A. A.

Hopkins (F. Gowland). **Huxley Memorial Lecture on Biochemistry : Its Present Position and Outlook. Delivered in the University of Birmingham on May 29th, 1924.**—*Lancet.* 1924. June 21. pp. 1247–1252. [2 refs.]

Although the lecturer makes apology for an "almost trivial" survey of the biochemical field, since he has included neither the green

plant nor microorganisms, he has here revealed a vision, ranging from the molecular structure and dynamics of self-regulated microcosms to the evolution of the phenomena of consciousness, which is very abundantly instructive and stimulative.

Biochemistry owes no direct obligation to the ancients. It began (with LIEBIG) in organic chemistry and a desire to isolate and determine the chemical composition of individual organic substances. But the living plant and animal were soon lost sight of in the excitement of synthetic manufacture of organic compounds, and the early achievements of biochemistry (in the case of animals) were limited to inferences, drawn from comparisons of intake and outgo, of processes intervening in the living body. In recent times biochemistry has been reanimated by contemporary advances in physical chemistry, particularly in knowledge of the properties of colloids and in more precise conceptions of factors—such as hydrogen-ion concentration—by which biochemical activity is conditioned ; and again remarkably invigorated by exact knowledge of the molecular structure of living tissues, particularly of the protein-complex and of its individual constituents (amino-acids). For vague notions of protein metabolism we now have clear conceptions of a definite succession of biochemical activities—of the liberation of the individual amino-acids in the processes of digestion and of the stages of change which each one of them undergoes in its passage in the body. From this exact knowledge of the chemistry of living tissues, too, the biologist has come to " understand that underlying the morphological differentiation of species there is a chemical differentiation " having its primary seat in the proteins of the blood and tissues.

But the most pure and significant product of biochemical thought—emphasizing " the reality of the influence of molecular structure in the dynamic events of living matter "—comes from the discovery of the internal secretions (*e.g.*, of adrenalin, of which the molecular structure is known) and their prepotence, in extremely small amounts, in equilibrating the organism as a whole. Such co-ordinating functions were supposed to be the sole prerogative of the nervous system, but we now know that " underlying the influence of the nerves there is a chemical co-ordination," and are justified in thinking that many or all of the tissues and organs, apart from their special functions, contribute to the circulating blood secretions that work for the harmony and balance of the whole body. The equilibrium maintained in the circulating blood itself is a significant biochemical phenomenon, illustrating as it does " the stabilizing effect of perfect buffering in a fluid which constantly receives additions of acid or alkali without appreciable changes in the concentration of hydrogen ions."

The importance of chemical properties as resulting from molecular structure is also " beginning to be seen in the catalytic agencies which are contained in the essential make-up of each individual cell." Though nothing yet is known of the molecular structure of enzymes, yet " glutathione," a universal constituent of living cells, which " may be looked upon as a simple model of an enzyme," is known by its molecular properties to be autoxidizable and by its mere presence in the cell to ensure that a constituent part of the cell-system shall display dynamic properties.

The recognition of active specific catalysts within the cell weakens the belief that the " physical basis of life " is a peculiar molecule, and tends to render the term " protoplasm " an abstraction. " There is no such thing as living matter in a specific sense. The criteria of

life are displayed by ' systems ' in which catalysed reactions occur in a colloidal milieu. The special attribute of such systems from a chemical standpoint is that these reactions are organized," not that the molecules are peculiar.

The lecturer briefly indicates some of the multifarious difficulties of biochemical research—due to the instability of living systems both in nature and in face of investigation—and some of the methods by which they are surmounted ; and he also refers to the importance in biochemistry of the infinitesimal—the prepotent influence exercised by substances present in minute concentration—the adjustments for which give a special stamp to biochemical work. He also gives us, incidentally, some idea of the high calling of the biochemist, who, apparently treating living matter with no more respect than dead matter, is really face to face with the organized (almost " purposeful ") reactions of self-regulated systems that in their higher developments are associated with the phenomena of consciousness and thus approach the veil of the unknowable.

A. A.

REVIEWS AND NOTICES.

VERDUN (P.) & MANDOUL (A.-H.). **Précis de parasitologie humaine. Parasites animaux et végétaux (les bactéries exceptées).**—3rd Edition. Revised. pp. 6+vi+937. With 434 figs & 4 coloured plates. 1924. Paris: Librairie Octave Doin, Gaston Doin, Éditeur, 8, Place de l'Odéon. (Collection Testut.) [Price 46 fr. 50.]

This excellent book worthily sustains the high standards of French tradition in its particular branch of educational literature, except, perhaps, that some of its illustrations are somewhat lacking in artistic finish. It covers the whole field of human parasitology, as above delimited, and does not wander too far outside it into over-long descriptive and taxonomic detail about things like blood-sucking flies, which—though to some extent concurrent with particular parasites, and to that extent imperative of recognition in a book dealing with those parasites—are themselves not parasites at all, either in their structural and biological adaptations, or in those environmental limitations that bring them within the same comparatively easy range of prophylaxis and treatment as parasites. In its plan and proportions the book follows well-approved lines; the parasites are grouped, defined, and arranged zoologically and botanically; each is concisely described, as also its development and its manner of spread and maintenance outside the host, and its way of access to and its development within its host or hosts; then its pathological effects and lesions on its hosts; and finally the treatment and prophylaxis. The information on all these points is up to date, though it may be noticed that Rhinosporidium is retained among the Protozoa, and the causative agent of trench fever is stated to be a spirochaete. An introductory chapter deals with such matters as the status and history of parasitology and the anatomical and biological characters of parasites—their atrophied organs, complicated and interrupted post-embryonic development, etc.

A. Alcock.

BABES (V.), BABES (A.) & BABES (Auriel A.) with BUSILA (V.), BUIA (I.), GHEORGHIU, SION (V.) & VASILIU (A.). **Travaux sur la pellagre exécutés sous la direction de V. Babes.**—*Annales de l'Institut de Path. et de Bact. de Bucarest.* 1922–23. Vol. 8. 312 pp. With 32 plates.

For very many years pellagra has been endemic in Roumania, and though, since the great war, the number of cases has decreased considerably the authors have had ample opportunity to observe the disease and to make pathological studies.

A full history of pellagra is given and the various etiological hypotheses are discussed. As might be expected in a work coming from Roumania the maize theory receives all attention and the other views practically none. In fact, the book is one more attempted vindication of the maize theory, which, in the view of many workers, is utterly untenable. It must be admitted that this bias goes a long way to lessen the value of the work.

Heroic attempts are described by which it was hoped that scientific evidence would be found for the theory that spoiled maize is intimately associated with pellagra. Unfortunately toxin neutralization methods, agglutination and complement fixation tests all gave negative results.

A chapter of real value deals with the role of gastric trouble in pellagra. Achlorhydria was found in more than 80 per cent. of cases, and the association of this condition with similar diseases such as pernicious anaemia and subacute combined sclerosis must not be overlooked in a search for the place of entry of infection.

It is refreshing to find that in the section dealing with neuro-pathology the often overlooked changes in the Betz cells are described.

The question of prevention and cure of pellagra is very thoroughly discussed, and in the latter, at any rate, the bias of the authors is not revealed and this part is therefore of greater value. Prevention methods fall into four headings. 1. By forbidding peasants to eat bad maize. 2. By the formation of pellagra hospitals, "Pellagroseries." 3. By the formation of pellagra colonies. 4. By "Commissions Pellagrologiques" for unifying results and encouraging research work.

In treatment the role of atoxyl is firmly stressed. This drug is given by injection of 10–20 cgm. every other day for ten days. Even children appear to tolerate the drug in this dose satisfactorily. The efficacy of the method is increased by giving "Acide Arsénieux" by mouth and by rubbing the patient with an inunction containing the same substance. There appears to be some clerical error in the dosage given with regard to these last methods so that the reviewer is forced to omit fuller directions.

To give some idea of the extraordinary success attained by the combined method of treatment the following facts may be quoted. In 14 cases all symptoms disappeared in 3–4 days; in 7 cases within 6–10 days, and in a further 8 cases within 10–28 days. These cases were re-examined after a period of six months and in none was a relapse recorded. For the stimulation of gastric secretion, "Eau de Slanic No. VI" is given.

These results are extremely interesting, and the authors claim that to the preventive methods already described and to atoxyl injection the marked decrease of pellagra in Roumania is directly due. An idea of the progress of the disease before these methods were introduced may be gained from the following figures :—

In	1892	16,500 cases.
,,	1896	13,000 ,,
,,	1897	19,000 ,,
,,	1898	21,000 ,,
,,	1899	32,000 ,,
,,	1910	53,480 ,,
,,	1911	80,000 ,,

Particularly worthy of praise are the beautiful plates illustrating the work. Some of these are in colours, and give an impression of the skin and tongue appearances which is wonderfully life-like.

It is difficult to do full justice to the enormous amount of observations and data collected together in this book. The attempt has been made, and we think successfully, to correlate all aspects of the disease and to apply new methods of research to old problems. The preconceived idea that bad maize is the cause of pellagra which dominates the whole work may, perhaps, be forgiven in view of the highly successful results in prevention and treatment attained in Roumania upon this assumption.

A. Douglas Bigland.